AMERICAN
GAS JOURNAL

93rd YEAR MARCH 1946 VOL. 2

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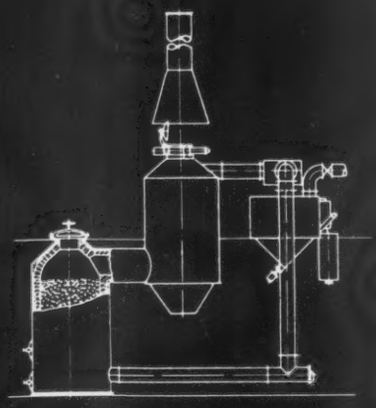
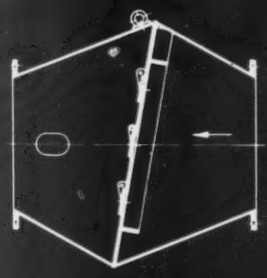
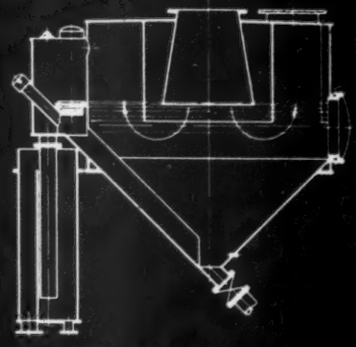


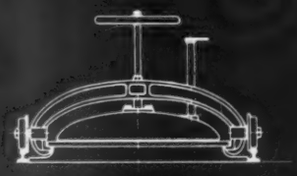
BLUE GAS MACHINE



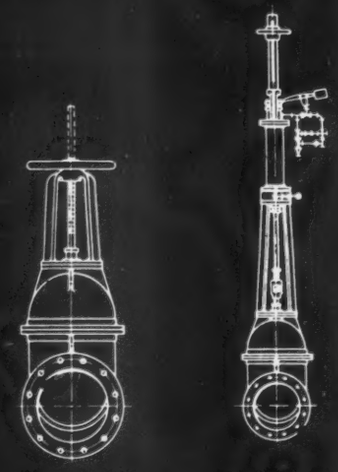
CHECK VALVE



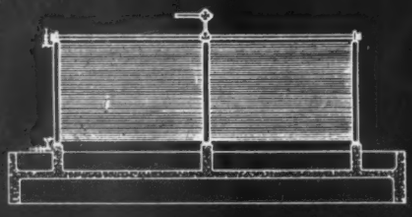
HYDRAULIC SEAL
OR
WASH BOX



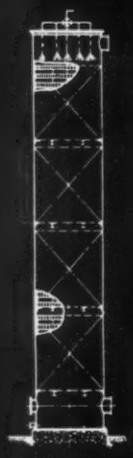
CHARGING DOOR



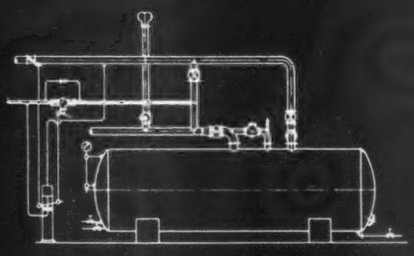
HAND OPER. HYDR. OPER.
GATE VALVES



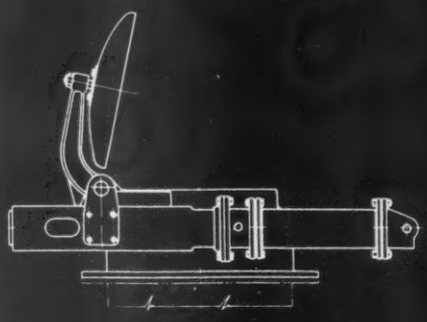
COOLING COIL



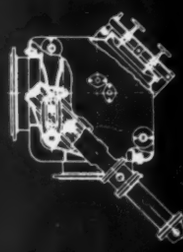
GAS SCRUBBER



STEAM ACCUMULATOR

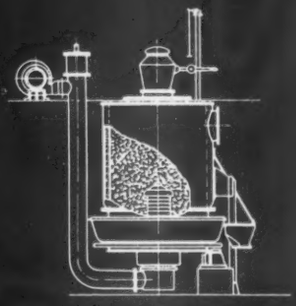


HYDRAULIC OPER.
STACK VALVE

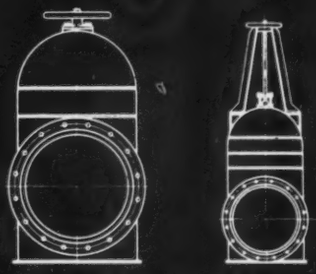


HYDRAULIC OPER.
REVERSING VALVE

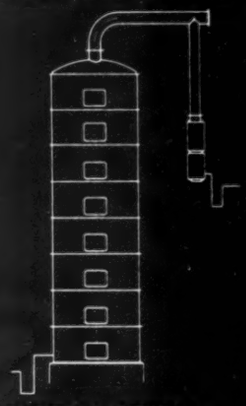
WASTE HEAT BOILER



GAS PRODUCER



BLAST GATES



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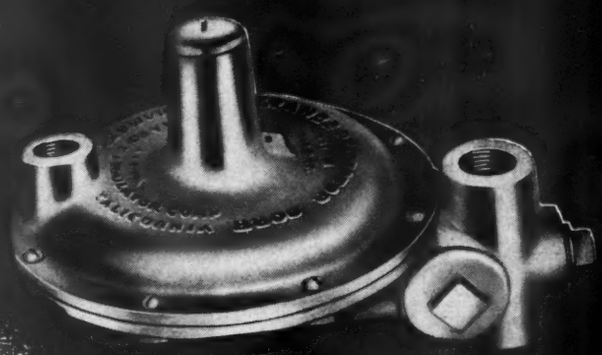

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(Excerpt from statement by Water Board Manager in a Southern City.)

Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago 3.

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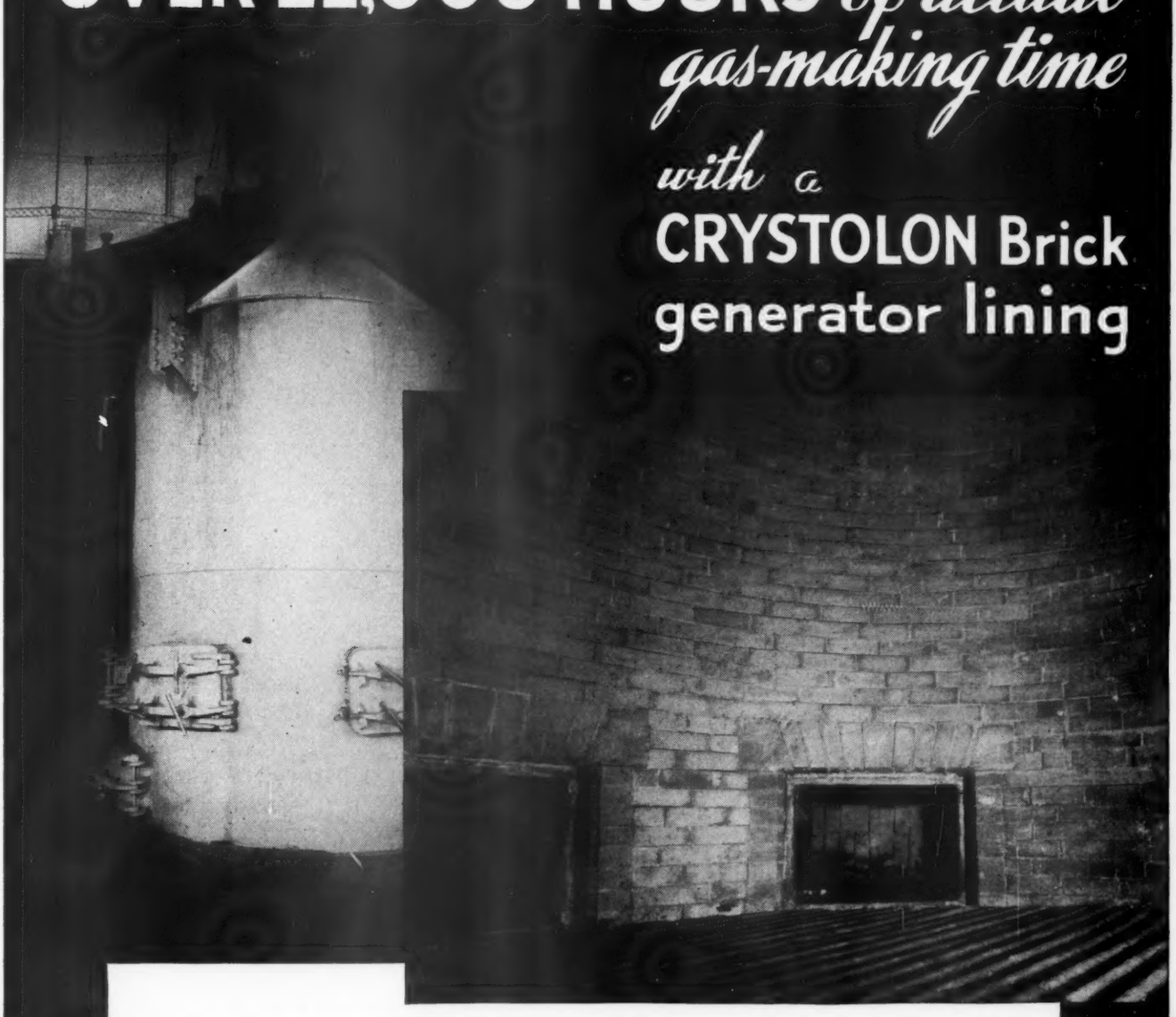
Standardized **MECHANICAL JOINT**
PIPE

OVER 22,000 HOURS *of actual gas-making time with a* CRYSTOLON Brick generator lining



"The CRYSTOLON Brick in our generator are still in service after more than four years of operation which included 22,362 hours of actual gas-making time, and we expect to operate this set through the coming winter."

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That's why Dressers are more than a coupling. They PROTECT the pipe, the joint and your investment in time and money.

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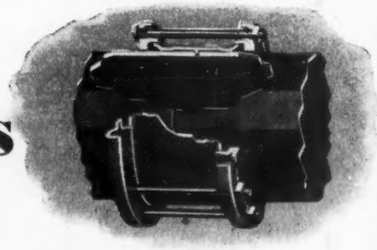

A Dresser is more than a coupling

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Outstanding Authorities

to Decide Winners of Magic Chef Design Competition

Contest has been approved by A. I. A.

The ARCHITECTURAL FORUM, sponsor of the Magic Chef Design Competition, has named an eminent board of judges to decide the winners of the $18,000 cash prizes for the best designed gas range of tomorrow.

This board consists of four of America's most prominent architects and a leading home economist. A record of the personal ability and fame of these individual judges would fill a book; hence, it must suffice to say that collectively they represent a board whose fitness for the important task assigned them could not be surpassed by any other similar group in the United States.

The overwhelming number of contestants from all walks of life who have entered this competition is assurance that the designs submitted will represent a cross-section of American opinion almost impossible to obtain by any other method—The highly skilled board of judges assures an impartial selection of winners based strictly on the merit of the designs submitted—The ultimate hope—A finer, more beautiful, more efficient Magic Chef than ever before—Truly the gas range of tomorrow, ready to play its part in a world that will be filled with the wonders of Gas.

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Magic Chef

RED WHEEL GAS RANGES AND HEAVY DUTY GAS COOKING EQUIPMENT

THE GAS RANGE WITH THE FAMOUS RED WHEEL

MARCH
1946

AMERICAN
GAS JOURNAL

VOLUME 164
No. 3

Uniform Appliance Installation Code Adopted by Western Plumbing Officials Assn.

By
Fred A. Herr

A BASIC SET of regulations under which for the first time the cities and counties of the eleven western states will be able to set up minimum standards of construction and achieve uniformity in ordinances pertaining to the installation of gas fittings and gas water heaters, is contained in a uniform plumbing code sponsored by the Western Plumbing Officials Association and distributed in printed form early in February.

The regulations governing minimum standards for gas fitting, piping and water heaters are contained in a complete chapter incorporated within a comprehensive uniform plumbing code adopted for sponsorship by the WPOA at its recent annual convention in Los Angeles.

The completion of the code and the action of the association of city officials in undertaking sponsorship for its inter-state adoption assumes considerable importance because the code may eventually govern the plumbing, gas fitting and gas water heater installation standards affecting some 15 million people in 11 states.

"The advantages of a code which would be acceptable in various jurisdictions have long been recognized," the code committee stated in submitting the code for adoption at the convention. "Increasing confusion resulting from different and oftentimes conflicting requirements in adjacent jurisdictions finally brought the matter to a head."

The completed code is the result of the combined efforts of representatives of the gas, plumbing, heating and allied industries. It represents the culmination of two years work to which building construction and management groups, material associations and manufacturers and others contributed advice and assistance.

Gas Code Drawn By Gas Engineer

The main code was prepared by a 23-man committee of the WPOA, headed by J. B. Davis of Los Angeles. The sections pertaining to gas fitting and water heaters were prepared by a sub-committee under the direction of H. W. Geyer, utilities engineer of the Southern Counties Gas Co., Los Angeles, who is a member of the association and its code committee.

In presenting the code, the committee stated it did not regard it as the final word or that it could be applied everywhere without change. The committee stated it recognized that local conditions may make amendments necessary and experience may dictate others.

A standing committee of three has been appointed by the WPOA to serve as a code revision committee and supervise the annual revision and amendment. Serving on the committee are W. L. Hallberg of Huntington Park, and Stephen I. Smoot, Los Angeles, president and secretary-treasurer, respectively of the association, and Mr. Davis.

The prevailing demand for a code which would eliminate the complexities of duplication and confusion caused by the use of different standards in the various cities and counties of the West and provide a basis for *minimum* standards of uniformity was demonstrated at the convention of the Pacific Coast Plumbing Officials Association.

Its immediate adoption in the form presented, subject to periodic revision and amendment, was urged by county and municipal officials of various cities, gas company executives and engineers, and representatives of building management and building material groups, contractor, builder, plumber and heating contractor associations.

Sponsorship of such a code by an association of municipal plumbing officials whose sphere of operations covers the entire western area was declared to be more practical and suitable than its promulgation by a gas utility, trade association or industrial organization which might be accused of bias or personal interest.

11 Cities Seek Code's Adoption

At the time printed copies of the code were distributed from the executive offices of the WPOA at Los Angeles early in February, Secretary Smoot announced that officials of 11 cities in California and other states had already signified their intention of seeking adoption of the uniform code for local regulation of plumbing, gas fitting and water heater installations.

For convenience of adoption by municipalities the code has been prepared in the form of an ordinance in which few changes, other than the insertion of the names of the city and officials, need be made before it can be submitted to the city council.

26 Sections on Gas

The regulations pertaining to gas fitting and water heaters are set forth in a full chapter of 26 sections—Sections 1501 to 1526, inclusive, of Chapter 15. The first section defines the scope of the gas chapter as follows:

"The regulations of this chapter shall govern the installation of all gas piping for buildings, or in connection with structures, or on premises; also, the installation of water heaters and vents thereto."

Section 1503 authorizes the municipal inspector (for whose appointment the code provides the machinery) or the gas utility to disconnect any gas appliances and/or gas piping which do not conform to the requirements of the code, or which may be found defective and in such condition as to endanger life or property.

Under the code, two inspections are made mandatory for gas pipe installations: (a) a rough piping inspection, to be made after all piping has been installed and before it has been covered or concealed or any fixture or gas appliance attached to it; and (b) a test or final piping inspection. This inspection, the code states, must be made after all piping has been installed and after all portions which are to be covered by plastering or otherwise have been so concealed and before any fixture or appliance has been connected. This test must include a pressure test subjecting the piping to an air pressure of 10 lbs. for 10 minutes without perceptible drop.

The code permits the above inspections to be waived in cases where the work authorized by the permit consists of additional piping to be installed on house gas piping which is already connected with the meter. In such cases the inspector is permitted to inspect the work in such manner as he deems advisable in order to assure himself the work has been performed in accordance with the intent of the code.

TABLE 1
MAXIMUM DEMAND OF TYPICAL GAS APPLIANCES
(Cubic Feet of Natural Gas Per Hour)

Domestic gas range	50
Storage water heater—up to 50-gal. tank	30
Storage water heater—40 to 50-gal. tank	45
Instantaneous coil water heaters:	
Capacity 2½ gal. per min.	100
Capacity 3 gal. per min.	125
Capacity 4 gal. per min.	160
Capacity 6 gal. per min.	240
Capacity 8 gal. per min.	320
Gas refrigerator	3
Radiant space heaters—5 single radiants	8
Radiant space heaters—10 single or 5 double radiants	18
Gas steam radiators—per section	2
Wall heaters	10
Restaurant equipment:	
Coffee urns—1 gal. capacity	10
Coffee urns—2-4 gal. capacity	15
Coffee urns—5-8 gal. capacity	21
Coffee urns—8-12 gal. capacity	35
Steam boilers—per horsepower	50
Waffle iron	12
Cake griddle	15
Steam table—per burner	15
Toaster—6-slice size	20
Toaster—9-slice size	32
Toaster—20-slice size	48
Restaurant Range:	
4 top burners, 2 ovens	150
6 top burners, 2-4 ovens	240

Certificate of Gas Piping Inspection

Section 1506 makes it unlawful for any gas company or other utility furnishing gas to connect any gas meter with any gas pipe in a building until a copy of the certificate of final piping inspection has been issued to the gas company notifying it that such house gas piping has been found satisfactory and ready for setting of a meter or meters.

The code provides that only those licensed to do gas fitting work in the city or county in which the code has been adopted as a local ordinance may install gas piping.

The minimum standards for construction and installation of gas piping, based on natural gas supplied at approximately eight inches water column pressure at the outlet of the gas meter, are set forth in Sections 1511 and 1512.

Those sections provide that where gas is delivered normally at pressure higher than 11 inches water column, the size of gas piping shall be calculated by means of standard engineering methods in a manner satisfactory to both the municipal inspector and the gas company supplying the gas. The volume of gas required at each piping outlet, the code stipulates, shall be taken as not less than the maximum hourly consumption rating specified by the manufacturer of the appliance to be connected to each outlet.

In cases where appliances are not yet definitely specified or connected, the gas demand for various appliances, as shown in a table included in the code (Table 1), may be used to determine pipe sizes.

The code provides that for space heaters of all types, including central furnaces and floor furnaces, the minimum required demand shall be taken as sixty-five one hundreds (0.65) of a cubic foot of natural gas per hour for each 100 cubic feet of volume of each room to be heated.

The minimum required demand at any outlet is set by the code at 20 cubic feet of natural gas per hour, and no supply pipe to any gas appliance may be installed having a diameter smaller than the inlet connection of the appliance.

Section 1512 presents regulations for size of gas piping, setting forth that the size of each portion of a system of gas piping shall be determined by means of Table 2, this table being based on natural gas supplied at approximately eight inches water column pressure at the meter.

TABLE 2
Size of Gas Piping
Capacity in Cubic Feet Per Hour

Pipe Size	Distance from Gas Meter to Most Remote Outlet of Entire System (feet)												
	10′	20′	30′	40′	50′	60′	70′	80′	90′	100′	125′	150′	200′
½″	75	55	45	38	34	30	28	26	24	23	20		
¾″	200	150	130	110	100	90	80	75	70	68	58	53	45
1″	430	300	260	220	200	180	170	160	150	140	120	110	100
1¼″	730	520	450	370	350	300	280	270	250	230	210	190	170
1½″	1200	830	700	600	550	500	450	420	390	370	340	300	270
2″	2500	1750	1500	1250	1100	1000	900	850	800	750	680	630	540

Maximum Pipe Lengths

The maximum length of run permitted of any given size pipe may not exceed the following:

Size of Pipe	*Max. Length Permitted*
½″	40′
¾″	80′
1″	100′
1¼″	150′
1½″	250′
2″	400′

The code permits that for conditions other than those covered by Table 2, such as longer overall runs of piping or greater total gas volume, the size of gas piping may be calculated by means of standard engineering methods satisfactory to the inspector and the gas company.

Material of gas piping is covered in Section 1513. This section provides that all pipe used for installation, extension, alteration and/or repair of any house gas piping shall be standard wrought iron or steel pipe, or brass or copper pipe of iron pipe size, and shall either be new or previously used for no other purposes than conveying gas.

The code specifies that all fittings used in connection with the above piping shall be malleable iron, brass, copper or equal; that all joints between pipes and fittings, unless welded, shall be screwed joints (American Standard or S.A.E. Standard thread), and shall be made up with white or red lead or other approved compound.

Minimums for Seamless Tubing

The code permits gas appliances not burning more than 90 cubic feet per hour to be connected with seamless metal tubing connectors, subject to minimum specifications for type and size, method of attaching, overall length and minimum diameter set forth in the code.

The code requires that all welded piping be tested in the presence of an inspector to withstand an air pressure of 50 lbs. per square inch for a period of not less than ten minutes without perceptible drop.

Separate regulations are contained in the code for installation of gas house pipe installed below ground.

Section 1516, pertaining to interconnection of housepiping systems, makes it unlawful to connect any gas appliance to more than one system of housepiping in such manner that the gas appliance may receive gas from more than one system of piping. The installation of valves to turn off or control the flow of gas from one system of housepiping to another when both systems are supplied with gas from separate meters, is prohibited. Inspectors are authorized by the code to order the removal of such cross connections between separate systems of housepiping.

Sections 1517 and 1518 cover such aspects of gas piping installation as type of risers for vertical pipe, drip pipes, pipe supports, meter locations, etc.

The code prohibits building gas piping into brick, stone, masonry or concrete walls and provides that when concealment in such locations is necessary the piping must be run in suitable recesses.

Special provisions have been incorporated in the code for the installation of piping for liquefied petroleum gas, these provisions supplementing those applying to gas piping.

Provisions for Gas Water Heaters

Sections 1525 and 1526 set forth requirements pertaining to installation and construction of gas water heaters. Installation of water heaters is forbidden in public garages, bathrooms, sleeping rooms, closets under stairs or landings, in the attic space of any dwelling or in any recess unless one side of the recess is entirely open.

On ventilation, the code provides that every compartment housing a gas water heater shall be provided with a vent at or near both the floor and ceiling, each vent being at least 36 square inches in area.

The provisions governing construction state that every water heater using gas shall conform to the "Approval Requirements for Gas Water Heaters" of the American Standards Association Z21.-10 — 1937, 1938, 1941 or 1944, and every such water heater must bear an approval label certifying that it conforms to those requirements.

The code provides that every gas water heater have an entirely separate and independent vent except that not more than four heaters may be connected to a common vent if constructed and installed in accordance with the following requirements:

(1) Location: All water heaters that are connected to the common vent shall be located in the same story of the building.

(2) Vent Manifold: If more than three feet of vent connection is required to connect a water heater to the common vent, the water heater shall be connected to a vent manifold.

(3) Length of Manifold: The length of the vent manifold shall not be greater than the height of the vertical vent to which it connects nor shall the length of the vent manifold exceed fifteen (15) feet.

(Concluded on page 62)

SIZE OF VENT AND VENT MANIFOLD

Number of Gas Water Heaters	*Max. Gas Input Rating of all Gas Water Heaters*	*Minimum internal diameter of Vent and Vent Manifold*
2 or 3	75,000 B.t.u.	5″
4	100,000 B.t.u.	6″
4	200,000 B.t.u.	7″
4	300,000 B.t.u.	8″

Current Water Heater Research

By
W. B. Kirk

Asst. Chief Research Engineer
American Gas Association
Testing Laboratories

IN RECENT years water heating research studies conducted at the American Gas Association Laboratories have presented basic information on such important factors as:

1. Fundamentals of Domestic Gas Water Heating.
2. Principles of Gas Water Heater Design for Maximum Hot Water Delivery.
3. Effect of Cold Inlet Water on Performance of Automatic Storage Gas Water Heaters.
4. Principles of Design and Sizing of Automatic Gas Water Heaters for Maximum Service Efficiency.
5. Various Aspects of Burner Design.

Data obtained have been published in all instances in bulletin form and distributed to the industry.

Having completed fundamental studies on many major items of water heater design, attention has subsequently been focused on control accessories. That timely assistance along these lines could be rendered to appliance manufacturers has been demonstrated during the war years by increasing difficulties encountered in the field with automatic pilots in which operation was effected by heating or cooling of thermostatic bimetals. It now appears that in some cases these types of devices have been incorporated in water heaters with the bimetallic thermal element subjected to operating conditions far more severe than those under which the element was designed to function. Consequently more and more complaints were received to the effect that shortly after these pilots were placed in operation they would "set" or "freeze" in the open position and thereby fail to function as a safety device for shutting off the gas supply in the event of pilot flame outage. In other cases, even though "freezing" in the open position did not occur, permanent deformations altered time of operation for turning gas off or on to such an extent that performance required for safety was not obtained.

Experienced requirements committees of the American Gas Association had envisioned the difficulties long before they occurred and had taken steps to insure satisfactory service by drafting more rigid listing requirements for automatic pilots. These new requirements were based on laboratory tests conducted under practical conditions with contemporary devices, and were considered adequate for the purpose of providing satisfactory controls. Unfortunately these new requirements did not become effective until 1941, and shortly thereafter we found ourselves at war. Exigencies of this national emergency resulted in a temporary suspension of the usual five year limiting period of certification of both appliances and accessories. Under this condition it was possible for a control listed in 1937 and normally due for retest in 1942 to be retained in the listing for the duration of the war, without re-examination and test under new and more rigid requirements. It is apparent, therefore, that some devices and appliances manufactured today could become out of date even in an industry as competitive and progressive as ours.

During this period, troubles with bimetal automatic pilots were brought to the attention of the Association's Committee on Domestic Gas Research for the purpose of investigating and correcting, if possible, causes of failure of these devices in water heater installations. Meanwhile some gas utilities had already begun to discourage the use of bimetals in their territories because of servicing difficulties previously encountered. Likewise, manufacturers seeking certification of the American Gas Association were apparently encountering trouble in meeting the new requirements, and the popularity of bimetals suffered a severe set-back.

Following a working outline approved by the Technical advisory Group for Domestic Gas Water Heating Research, the Laboratories staff initiated an investigation of longevity and applicability of thermal elements used in automatic gas pilots. This project included a study of the effect of pilot flames, flue gases, impingement, temperature, and heat distribution on thermal elements as well as investigation of their physical properties.

A preliminary study of catalogs and literature published by bimetal manufacturers indicated that development of thermostatic bimetals has reached an advanced stage. A score or more of metals and alloys having either high or low coefficients of expansion have been employed in developing hundreds of useful combinations in sheet, wire, and tubing forms. Rare metals such as platimum, palladium, gold, silver and their alloys as well as such base metals as various iron and steel alloys, invar, brasses, bronzes, etc. are combined so that a layer of low expansive metal is joined with one of high expansive metal. Joining is accomplished in different ways by different manufacturers. For example, in some cases a flux is used and surfaces to be joined are heated and pressed together. Another method consists of sealing the outer edges by heat treatment.

It can readily be understood that when two different metals are so joined and subjected to heat, one side tends to stretch or expand to a greater extent than the other and a bending moment is obtained. Thus if one end of the bimetal is secured the other end will move through space. Formulae have been developed for predicting deflection characteristics of such shapes as simple strips, U's washers, S's, hairpins, spirals, and helixes as well as several other special shapes formed from bimetal sheets. Applications in homes, industry, and transportation vehicles are almost too numerous to list and bimetallic devices may be found anywhere where heat or temperature indication or control is needed. Most manufacturers of bimetals have well-equipped and excellently staffed laboratories for assisting their customers in designing and installing automatic controls for effective operation. It would appear, therefore, that if a careful selection of bimetal is made and due care used in installations to insure proper design conditions these types of controls can be used to advantage.

Before studying effects of operating conditions, tests were conducted to determine the relationship of bimetal temperatures to ambient temperature with heating of the bimetal effected by a small gas pilot flame. Although average temperatures of bimetal samples were recorded originally by means of several thermocouples, it was soon discovered that temperatures measured immediately above the pilot flame were considerably above the average. For example, in one test selected at random minimum bimetal temperature was 676 F, average was 745 F and maximum was 831 F. In this particular test

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Presented at American Gas Association Technical Conference on Domestic Gas Research, Cleveland, Ohio, February 18-19, 1946.

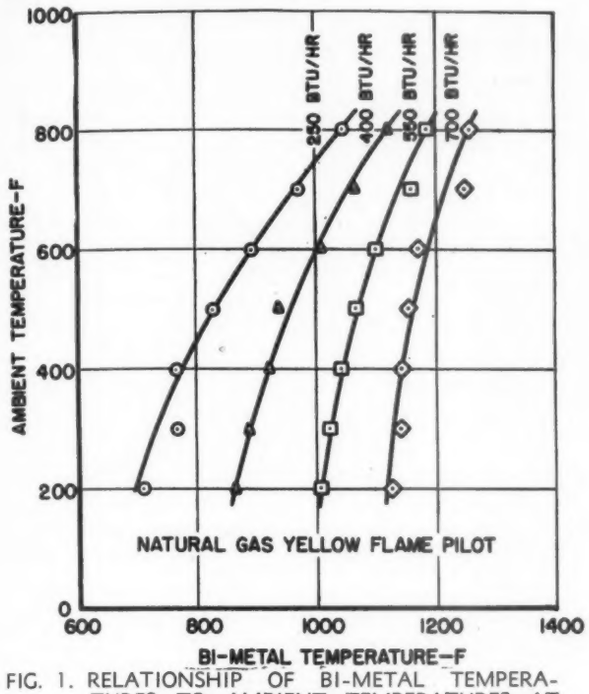


FIG. 1. RELATIONSHIP OF BI-METAL TEMPERATURES TO AMBIENT TEMPERATURES AT VARIOUS PILOT INPUT RATES

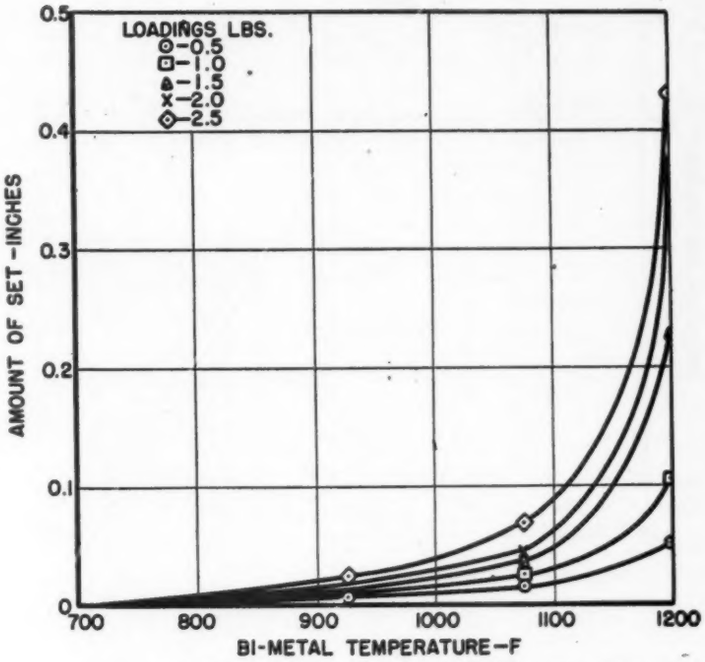


FIG. 2. DEGREE OF "SET" TAKEN IN BI-METAL NO. 5 AT VARIOUS TEMPERATURES
Bi-metal strip, ¼ in. width, 1¾ in. effective length
Active range of deflection to 650 F
Maximum working temperature—800 F

ambient temperature was 420 F, and gas pilot rate was 300 Btu per hour. Since the maximum spot temperature attained influenced properties of the bimetal, all subsequent work was based on maximum rather than average temperature. An illustration of results of these relative temperature tests is shown by curves plotted in Fig. 1. Gas pilot input rate was varied from 250 to 700 Btu per hour and ambient temperature was maintained at various levels ranging from 200 to 800 F. In all these tests the pilot burner was located ¾ in. directly below the bimetal strip.

The curves demonstrate quantitatively that bimetal temperatures do not increase in direct proportion to ambient temperature for any given pilot rate. At low ambient temperature, bimetal temperatures were appreciably influenced by gas pilot rate variations as indicated by spreading of the curves near the bottom of the chart. As ambient temperature was increased, effects of pilot rate variations on bimetal temperatures were naturally reduced as indicated by convergence of curves near the top of the chart. A comparison of values plotted at 800 F ambient temperature with those at 200 F shows that bimetal temperatures increase due to heat from the pilot is about 50% less at the higher ambient temperature.

Another way of expressing this thought is that with low pilot rates increase of ambient temperature result in an appreciably increase in bimetal temperature but at higher pilot rates this effect is successively less pronounced. For example, with a gas pilot rate of 250 Btu per hour a 345 F build up in bimetal temperature was recorded in raising ambient temperature from 200 to 800 F whereas the build-up with a 700 Btu per hour pilot rate was only 140 F.

It is interesting to note from Fig. 1 that even with a low pilot rate of 250 Btu per hour it is quite possible for maximum temperature of a bimetal installed under these conditions to exceed 1000 F. In this particular instance an ambient temperature of 750 resulted in a 1000 F bimetal temperature. With a pilot rate of 550 Btu per hour or more it became essentially impossible, for practical purposes, to reduce maximum bimetal temperature below 1000 F, with this particular arrangement of bimetal and pilot flame. When it is considered that recommended operating temperature ranges of most bimetals are below 1000 F, it is evident that considerable care must be exercised not only in choice of bimetal but in installation design as well. In some cases it may be necessary to shield the element from main burner heat, or pilot heat to a certain extent, or both.

Tests were also conducted to determine relationships between bimetal temperatures and amount of "set" or permanent deformation under various load conditions. Most of the published literature lists temperature-deflection values for various bimetals under conditions of no mechanical load and of even heat distribution. These values are not directly applicable. Since most bimetal safety devices installed on water heaters are operated mechanically rather than by making or breaking of electrical contacts, they are necessarily subjected to load when the gas valve is opened or closed and usually must overcome a spring tension of some sort when heated. As previously indicated they are also subjected to uneven heating as a rule because of adjacent pilot flames.

An illustration of results obtained is shown in Fig. 2. In this figure are shown amounts of "sets" of permanent deflection recorder for a bimetal with an 800 F maximum working temperature under various loadings ranging from 0.5 to 2.5 pounds as temperature of strip samples was increased to 1200 F. At temperatures above 700 F, degree of set increased with temperature and was appreciably affected by loading applied. Extreme condition, of course, was the 2.5 pound loading on a strip heated to 1200 F which resulted in a permanent set of 0.42 inches. As this particular bimetal was designed for use at temperatures under 800 F and was heat-treated at 800 F, these results could be expected.

However, another bimetal sample, heat-treated at 1200 F, and designed for use under temperature conditions as high as 1200 F, also developed a permanent "set" at temperatures above 700 F when subjected to load-

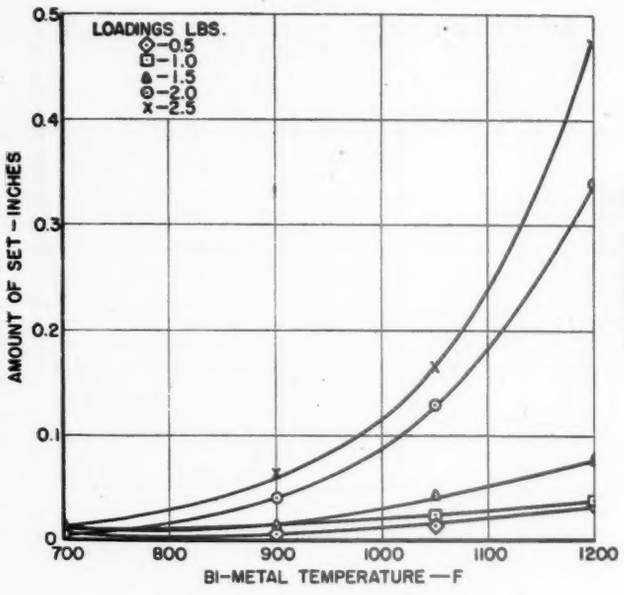


FIG. 3. DEGREE OF "SET" TAKEN IN BI-METAL NO. 8 AT VARIOUS TEMPERATURES
Bi-metal strip, ½ in. width, 1¾ in. effective length
Active range of deflection to 650 F
Maximum working temperature—1200 F

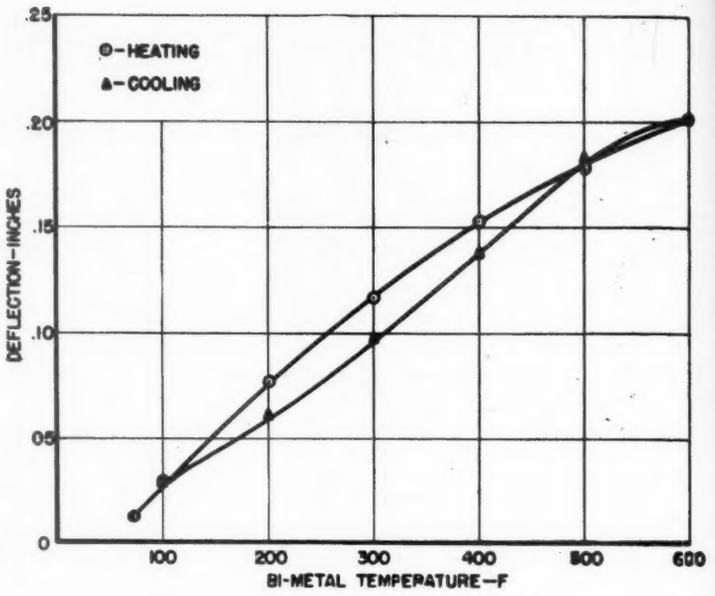


FIG. 4. DEFLECTION CHARACTERISTICS OF BI-METAL NO. 5A

ing. From curves in Fig. 3 it may be seen that amount of set at 1200 F varied from 0.035 to 0.472 inches as load was increased from 0.5 to 2.5 pounds.

In interpreting these results it must be remembered that although the initial force required to operate a gas valve may be as low as 0.5 lb. the valve mechanism usually cannot be moved further once it has been fully opened. Consequently if the bimetal still needs to expand as temperature is increased it is subjected to increasing load with the result that permanent distortion takes place. Magnitude of this permanent distortion is influenced by the fact that the bimetal is at its highest working temperature and therefore more susceptible to physical failure than at lower temperature. In installations of this type it may be necessary to select a bimetal with a rate of deflection that falls off rapidly once the actuating temperature has been reached.

Observations of various samples under carefully controlled conditions indicated that bimetals following heating do return to their original position without developing a permanent set provided they are not overloaded or overheated. Their action in this respect is shown by heating and cooling deflection curves in Fig. 4.

This particular bimetal strip was heat treated at 1000 F. Temporary deflections were subsequently measured as it was heated gradually and uniformly to 600 F and then cooled to room temperature. Although deflections upon heating differed from those on cooling it will be observed that no permanent set occurred. Several subsequent heating and cooling cycles failed to alter these characteristics even though maximum temperature was maintained for periods as long as six hours before cooling.

From this work and from a survey of the industry it has been concluded that the primary cause of unsatisfactory performance of bimetals in gas appliances may be attributed to employment of bimetallic elements which are designed for and heat treated at too low a temperature for the intended application, or which are insufficiently rugged from the standpoint of withstanding loads without permanent deflection when heated. Working (drilling, cutting, etc.) of bimetals before installation without repeating the heat treating process may also be a contributory cause in some cases where an appliance manufacturer is not aware that working of a bimetal may alter its designed characteristics, and that they can be restored only by proper heat treatment before final installation.

The foregoing difficulties may be readily combined and overcome by proper application engineering. Bimetal manufacturers have expressed a desire to assist and to cooperate with water heater manufacturers in bringing about an early solution to this problem. If necessary, new combinations of metals may be developed as a result of laboratory tests with completely assembled units. The primary need, however, it to bring about a more complete understanding of problems between bimetal manufacturers and water heater manufacturers.

Another phase of water heating research approved by the Technical Advisory Group and recently initiated at the Laboratories consists of a study of special types of burners for flames adaptable to gas water heaters. As all previous research conducted on burner design has dealt with fundamentals of burners alone, this particular project represents a new step forward. For the first time in the history of the Laboratories attempts will be made to correlate previously determined burner design knowledge with principles involved in their practical applications to water heaters.

The new project has been underway too short a time to yield any conclusive data thus far. It is intended that it will cover relationships of design, placement and secondary aeration of burners with combustion, heat transfer, burner operation, pilot operation, and service efficiency. Variations in burner design will include size, shape, and primary aeration. For example, primary aeration studies will cover the range from non-aerated blue flame burners to those which inject all air required for complete combustion as primary air. It is expected that results of this investigation will contribute materially to the art of burner design from the standpoint of application to gas-fired water heating equipment.

A. G. A. Technical Conference on Domestic Gas Research

THE THIRD A.G.A. Technical Conference on Domestic Gas Research was held in Cleveland, O. Feb. 18th and 19th. The meeting was sponsored by the Committee on Domestic Gas Research, F. M. Banks, Southern California Gas Co. Chairman.

At the Annual Meeting of the American Gas Association, held in New York, Oct. 12, 1939, Mr. Herman Russell, President, Rochester Gas & Electric Corp., Rochester, N. Y., made the following statement: "The time has come when these developments, directly the result of research work, must be greatly enlarged and intensified if our industry is to maintain and enhance its position in the heat energy requirements of the home and industry. We are now face to face with the need for another major cooperative effort — a comprehensive, well organized research program."

This conference emphasized the fact that the research program is moving ahead rapidly. Interest in it was evidenced by an attendance of nearly 300 gas company executives and representatives of appliance manufacturers.

F. M. Banks

The technical advisory groups are under the chairmanship of men of wide experience, who are giving much time and thought to the problems of each committee group. The chairmen of the advisory groups are: Domestic Gas Water Heating, L. R. Mendelsohn, Hotstream Heater Co.; Central Gas Space Heating, Keith T. Davis, The Bryant Heater Co.; Direct Gas Space Heating, E. C. Adams, Adams Bros. Mfg. Co.; Burners, Controls and Accessories, William R. Harmsworth, Servel, Inc.; Gas Summer Air Conditioning, C. E. May, New Orleans Public Service, Inc., and Domestic Gas Cooking, Charles M. Mayer, The Tappan Stove Co.

Several papers, prepared by members of the staff of the A.G.A. Testing Laboratories, were presented. They include the following:

Current Water Heater Research By W. B. Kirk, Asst. Chief Research Engineer.

Fundamentals in Use of Radiants As Applied To Domestic Gas Range Broilers By Milton Zare, Research Supervisor.

Technical Progress in Totally Aerated Burner Studies By Herbert Luoma, Chief Engineer, Domestic Gas Research.

Fundamentals of Heat Absorption by Utensils in Gas Range Ovens By Joan Huck.

Current Central Heating Research By Robert C. Weast, PhD, and James A. Morse.

Current Research on Gas Burner Injection Characteristics and On Pilot Burners By Earl J. Weber.

R. M. Boothby
Pres. American Gas Assn.

L. C. Harvey
Pres. Gas Appliance Mfrs. Assn.

C. E. Blome
Purdue Research Foundation
Housing Division

Oven Heat Distribution in Domestic Gas Ranges By F. E. Hodgdon.

The papers by W. B. Kirk and by Weast and Morse are published in full in this issue of The Journal.

The luncheon session on Monday was addressed by Everett J. Boothby, President, American Gas Assn. and Lyle C. Harvey, President, Gas Appliance Manufacturers Assn. Both speakers emphasized the great value of the research program to both the utilities and manufacturers of appliances.

C. E. Blome, Purdue Research Foundation, Housing Division, talked on the subject "Problems in Connection With Vapor Condensation in Homes," at the Tuesday luncheon, and showed moving pictures of conditions he had found in several houses he had personally investigated, Mr. Blome stated that they were endeavoring to find the causes, and then would try to find the remedy. At present there is no complete answer to the problem.

A reception by the Bryant Heater Co. for all delegates attending the conference was held Monday afternoon, 5 to 7.

All arrangements for the meeting were under the direction of Eugene D. Milener, secretary A.G.A. Committee on Domestic Gas Research.

One Public Relations Program Centers Around Fishing

By

Arthur K. Smart

A NEW public relations program by which the Pacific Gas and Electric Company is providing weekly information concerning fishing conditions throughout Central and Northern California is gaining many friends and much favorable comment for the company, reports Thomas P. Ludcke, of the public relations department of P. G. and E. at San Francisco.

The experiment, which was instituted upon the opening of the trout season in California last spring, has proved so successful that its continuation into other seasons is now assured, says Mr. Ludcke, and thought is being given to methods by which some substitute can be found for months which are not in the fishing season.

The entire experiment resulted from capitalizing on a piece of criticism which was directed against the company in 1944. Over Memorial Day week-end a year ago the waters in many of the rivers in Northern California were so high and so rapid as to create poor fishing conditions. Commenting upon this fact, the fishing editor for a San Francisco daily paper rashly suggested that the poor fishing might have resulted from the fact that the utility company had opened the gates too wide at some of its dams. The writer went on to philosophise on the damage which a utility company could do to fishing through such thoughtless acts.

The public relations department of the company was quick to point out to the writer that his conclusions were incorrect and that the utility company had nothing to do with the high water and the poor fishing conditions. It was able to show him records of its various control stations which revealed that no valves had been opened that week-end and that the high water came from abnormally warm weather. An apology followed and the entire incident might have ended there, had not the circumstances started the public relations department thinking about the great effect of the company upon fishing conditions and the manner in which the records of its control stations could be used to predict fishing conditions in advance.

When the trout season opened last May P. G. and E. was ready for its experiment in predicting fishing conditions. Employes at the many control stations of the company throughout the Northern and Central parts of California were asked to furnish information on the height of the water which might affect fishing. They were also asked to question as many fishermen as they might encounter concerning their luck—both as to the number of fish caught, and the kinds and the size of the fish.

A round-up of this information from all the various stations and substations throughout a radius of several hundred miles was found to give one of the most complete "pictures" of fishing conditions in the state that could be desired. The information was then mimeographed and sent to newspapers and radio stations to be relayed to the public.

In the months which have elapsed since the experiment was started, it has already established itself as an institution among California fishermen. Many would not even plan a fishing trip without first consulting the weekly P. G and E. forecast. Newspapers and radio stations make a regular feature out of the service and are more than glad to give full credit to the source of their information. Sporting clubs tack the information sheet on their bulletin-boards and many editorials and letters of appreciation for the service have told the officials of the company how much good-will they have created through their program.

Mr. Ludcke estimates that the entire experiment requires little more than one man-day per week and feels that it pays big dividends for the time involved. He says that it requires most of an afternoon to round up the information from the various stations throughout the State and the better part of the following morning to prepare the bulletin. After that has been done there is nothing left but the mechanical job of getting out the mimeographed bulletins. The mailing list is now about 250 and specialized in newspapers, radio stations and sportsmen's clubs. There have been many requests for copies of the bulletin and the company is generally willing to add names upon request.

Last fall attempts were made to include information about hunting as well as fishing in the bulletin. Officials of the company point out that they do not have access to quite such detailed information about hunting as they do about fishing, but that even this service seems to be superior to anything which is now provided and is greatly appreciated.

Mr. Ludcke believes that the experiment which has been undertaken represents the type of activity by which large companies can win many friends through the performance of real services. He points out, however, that mostly utility companies are best situated to furnish information on the subject of fishing conditions.

"What woman *wills*... will be"

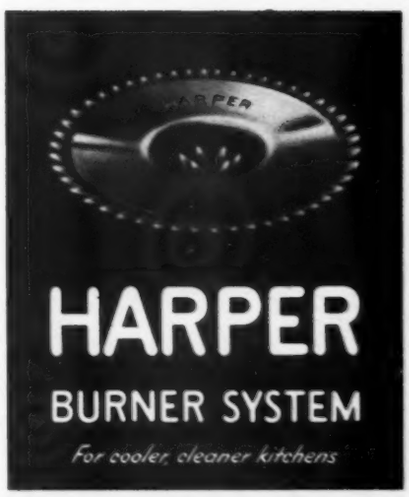
She wants this aid to more healthful *cooking*

THE MODERN HOUSEWIFE has learned that with the Harper Burner System foods retain more of the important vitamins and minerals. That is one of many reasons why she wants Harper burners on her next range.

The superiority of the Harper burner lies in its more accurate control of heat. Each burner is actually 2 burners in 1 . . . a burner within a burner . . . both operated and controlled by a single handle. The small, inner *cooking* burner can be used entirely independently of the large *starting* burner. No other top burner possesses this vital advantage . . . the key to lower heat levels than are possible with ordinary burners.

No other top burner better meets the top burner requirements in the AGA campaign of appliance improvement and promotion designed to augment the position of gas as the ideal cooking fuel.

Copr. 1946, Harper-Wyman Co.



On next page
WHAT USERS SAY

"FOODS RETAIN MORE VITAMINS"

says this user of the HARPER BURNER SYSTEM

WITH FOOD SHORTAGES and high prices to contend with, housewives everywhere appreciate the Harper way of cooking that prevents undue loss of the nutritional values of foods. Mrs. Alfred D. Johnson, 93 Villa Avenue, Edgewood, R. I., says:

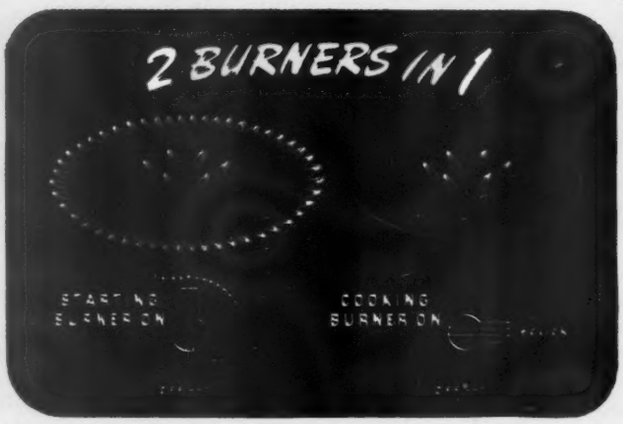
"I have the satisfaction of knowing that the foods I cook retain more of their important mineral salts and vitamins. You don't need excess water with the Harper Burner System, so vitamins are not destroyed or poured down the drain."

. . . and here's the reason

WITH THE HARPER BURNER SYSTEM, only a little water—a cupful is plenty—is needed to cook vegetables. This small quantity of water is quickly brought to a boil by the big STARTING BURNER. Then the small, economical COOKING BURNER takes over the remainder of the cooking. It supplies the proper amount of heat and will maintain the water at the boiling point of 212 degrees . . . but without unnecessary and wasteful violent boiling.

More of the vitamins and minerals are retained because less water is present to dissolve them. Still there is no danger of the vegetables scorching or boiling dry since very little water is evaporated. Foods are "boiled gently" . . . do not reach the table soggy and tasteless due to overboiling.

NOTE: A *new* and *improved* Harper Burner System is now available for range manufacturers who are producing de luxe ranges. Harper-Wyman Company, 8562 Vincennes Avenue, Chicago 20, Ill.



The Harper Burner System operates on the unique principle of "2 burners in 1" . . . a STARTING BURNER plus a small, economical COOKING BURNER, both controlled by the same handle. It is subject to finer gradations of low heats—greater control and economy—than any other top burner.

HARPER BURNER SYSTEM

"HOLDS THE LINES FOR GAS"

HARPER BURNER SYSTEM

—One of the standards of top burner performance under cp

Current Central Heating Research

By

Robert C. Weast, PhD, and James A. Morse

American Gas Association Testing Laboratories

Part I. Studies of Heat Transfer

ONE of the most complex problems of heat transmission is evaluation of the performance of a combustion chamber of a furnace in which heat is transmitted simultaneously by conduction, convection and radiation. Two methods of treatment of this problem are possible. The first is theoretical and consists of an attempt to evaluate various individual heat transfer factors, each according to principles advanced in present publications, and to combine them. The second is empirical in which furnace test data are analyzed in the attempt to detect factors felt to be of importance. At the present time two of the central heating research projects outlined for study at the American Gas Association Testing Laboratories deal with quantity of heat transferred from specific heat exchangers. A third project dealing with the feasibility of employing a single gas-fired unit for both house heating and water heating during winter months and for water heating alone during summer months is discussed in Part II of this paper. The two heat transfer projects differ in methods of attack and in the manner in which results are to be expressed. The first of these studies is termed "Fundamentals of Heat Transfer" and deals mainly with heat transfer in that area of the heat exchanger exposed to direct radiation from the flames. It is desired to learn the quantity of heat transferred in excess of that which would be transferred if no flame were present and to determine heat transfer coefficients vertically along the length of the heating element.

Data now being assembled will be presented in a bulletin in such a manner as to make them applicable to gas fired heat exchangers that may be air, water or oil backed. A series of tables, charts, and sample calculations will be prepared in order to facilitate work of design engineers in application of the fundamental data obtained.

Test equipment employed in obtaining fundamental data includes the usual laboratory instruments such as wet test meters, multiple switches, CO_2 adsorption apparatus, and potentiometer. In addition there is also shown the heat exchanger unit, a small centrifugal blower capable of delivering 400 cfm, and an air-gas proportioning device. The blower is employed to force known quantities of air past the outside of the heating element but within the insulating jacket. The mixer supplies air and gas in known proportions before the mixture is burned, thereby providing a control for primary air and gas input rate to the test burner.

Cross sectional drawings of the heat exchanger and heat exchanger support are shown in Figs. 1 and 2 respectively. In Fig. 1 the heat exchanger is a 4 in. diameter tube separated from an insulated wall by a 2 in. annular space through which air is blown. Thermocouples are silver soldered to the heating element at 1 in. intervals for the first 12 in. above burner ports which are level with the bottom of the heating element. The last six thermocouples on the heating element are 2 in. apart. Locations of other thermocouples to determine temperatures necessary for data for this investigation are also illustrated in Figs. 1 and 2.

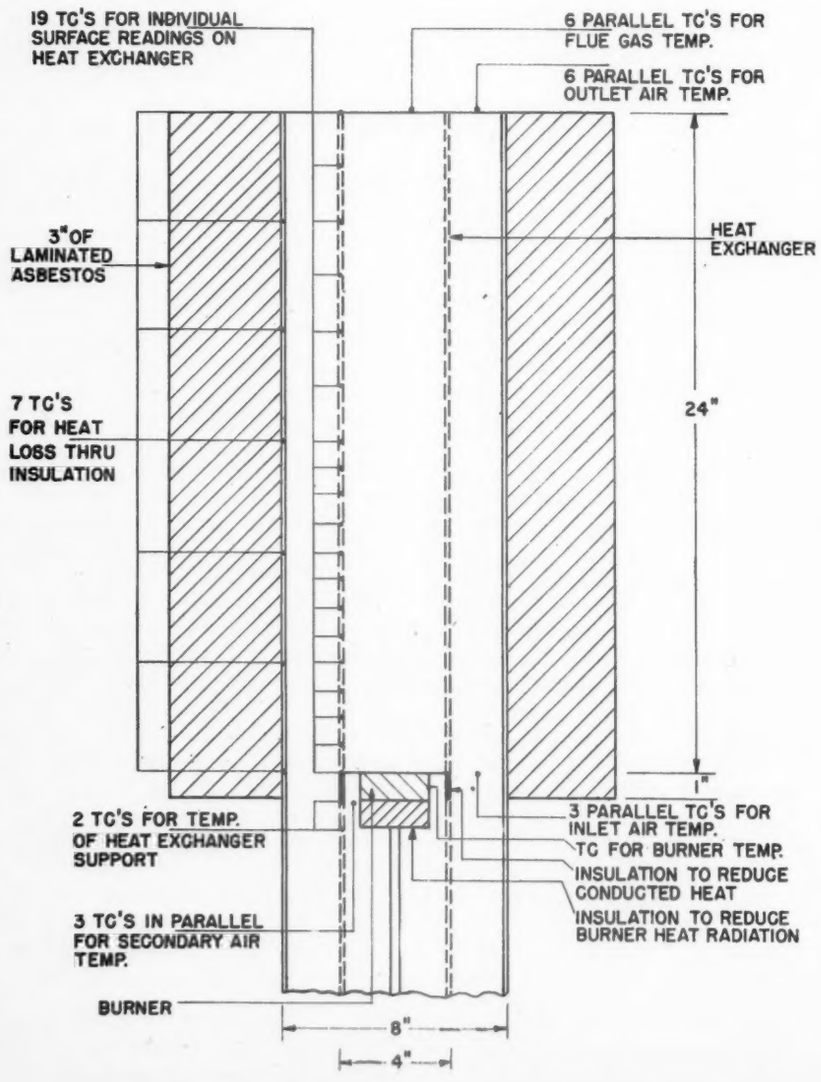
In addition to those thermocouples shown, a No. 38 gage iron constantan couple is used to probe vertically air temperatures in the annular space between the heating element and insulating jacket. This thermocouple is arranged so that its lateral distance is half way between the heating element and the insulation. Selection of the mid-point as the desired distance resulted from two considerations: (1) ease of duplication of thermocouple location after each test, and (2) assurance of good mixing of the heated air at this point through turbulence of the air stream. Calculation of Reynold's numbers for velocities used in this investigation gave values ranging from 5,000 to 28,000 depending on the quantity of air blown past the heating element. The greatest quantity of air used so far in this investigation has been 209 cfm which results in a velocity of 800 feet per minute and a Reynold's number of 28,000. For a Reynold's number of 5,000 a rate of 38 cfm and a velocity of 145 feet per minute were necessary. Values of this magnitude gave a large margin of safety beyond Reynold's numbers of 2,000 to 3,000 which occur in the zone where transition from laminar to turbulent flow takes place. Conditions causing turbulent flow in the annular space are very desirable because of higher heat transfer coefficients and because of difficulties in determining the heat content of an air stream having laminar flow.

Further study of Figs. 1 and 2 shows that air is blown past the heating element in a direction parallel to its length. The purpose of circulating air around the heating element in this manner is to obtain uniform air flow around all parts and to increase heat transfer coefficients on the outside of the heating element so as to minimize any errors which might result in calculation of such coefficients on the inside of the heating element. (It is these heat transfer coefficients on the inside of the tube in the flame region which are of special interest in this investigation.) It is fully realized that by directing air normal to the heating surface total heat transfer could be increased to about seven times that obtained by air flowing parallel to the heating surface, although the air flow in both cases is turbulent. The chief objection to directing air flow normal to the heating element is that heat transfer coefficients would vary around the circumference of the heating element for any given height above burner port level. This would be desirable from the standpoint of determining heat transfer coefficients at any specific height on the heating element.

As a result of the above considerations, the diagram shown in Fig. 1 as been used in an effort to obtain "point" heat transfer coefficients and to determine the increased heat transfer in the flame region of the combustion chamber over and above that

which would occur if only hot gases were passing through the heating element. Early tests were made with a No. 20 gage 4 in. diameter black sheet metal tube 2 feet long. Input rates were varied from 4,000 to 30,000 Btu per hour with CO_2 content of the flue products maintained constant but with primary air varied by use of the mixer mentioned previously. Other tests were made with the same heating element when input rate and primary air were maintained constant but excess air was varied. Data obtained indicated two results which had not been anticipated. First, it was found that at the higher gas input rates temperature of the tube was approximately constant for its entire length. At gas input rates less than 15,000 Btu per hour there was an appreciable temperature gradient along the tube, but it was not of sufficient magnitude to cause any great difference in local individual coefficients. Tube temperatures ranged from 200 F at the low input rates to over 750 F at the high rates. Second, for a constant gas input and CO_2, but with varied primary air, tube temperatures were highest when primary air was at a maximum and decreased as primary air decreased until the flame became yellow. When the flame was yellow tube temperatures increased beyond those resulting with a blue flame low in primary air but did not reach those tube temperatures obtained when a highly aerated flame was used. For example, at 20,000 Btu per hour input rate, with 9.6% CO_2 in the flue products and with air blown past the heating element at a velocity of 800 ft. per minute the tube temperature was 649 F when primary air was 74.7%. It decreased to 565 F when primary air was lowered to 37.7% and then increased to 585 F when primary air was further lowered to 9.9% at which primary aeration the flame burned yellow. Attempts to burn gas at the above rate in the test assembly used with no primary air resulted in a very smoky flame, indicating incomplete combustion and hence not suitable for comparing energy relationships.

Figure 1:—Heat Exchanger.


19 TC'S FOR INDIVIDUAL SURFACE READINGS ON HEAT EXCHANGER
6 PARALLEL TC'S FOR FLUE GAS TEMP.
6 PARALLEL TC'S FOR OUTLET AIR TEMP.
3" OF LAMINATED ASBESTOS
HEAT EXCHANGER
7 TC'S FOR HEAT LOSS THRU INSULATION
24"
1"
2 TC'S FOR TEMP. OF HEAT EXCHANGER SUPPORT
3 PARALLEL TC'S FOR INLET AIR TEMP.
TC FOR BURNER TEMP.
INSULATION TO REDUCE CONDUCTED HEAT
INSULATION TO REDUCE BURNER HEAT RADIATION
3 TC'S IN PARALLEL FOR SECONDARY AIR TEMP.
BURNER
8"
4"

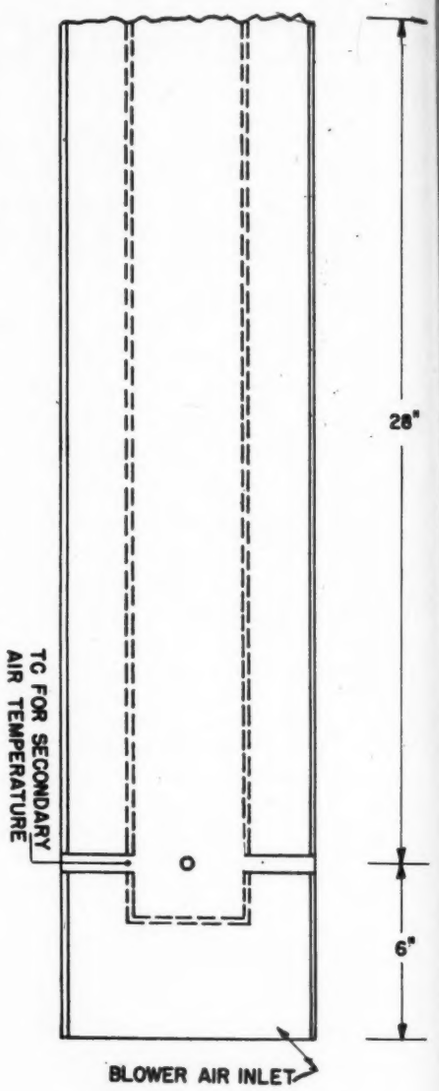


Figure 2:— Heat Exchanger Support.

As a result of the heating element being of uniform temperature throughout its length a light weight (No. 28 gage) stainless steel tube was substituted for the black iron tube in the hope that the lower thermal conductivity of stainless steel would result in a greater thermal gradient along the length of the heating element. However, at the present time no suitable tubes have been found, due to either a change in emissivity of tubes during use or to warping of thin tubes. Present plans include use of No. 20 gage 4 in. diameter seamless stainless steel tubes which will be chemically treated to become black and to remain so at temperatures encountered in this research.

Information obtained from this study will be augumented by data from literature, of which there are a great amount. This will be done in order to incorporate such variables

as flame temperature and mass, shape of combustion chamber, and addition of baffles. It is believed that data of this type will be an aid to those engaged in furnace design and of particular value in the design of combustion chambers for uniformity of temperature distribution and elimination of hot spots.

The second research project on heat transfer deals with securing such data as may be obtained by employing contemporary furnaces and burners. In addition to various conventional burners, special types having totally aerated and non-aerated flames will also be studied. Each furnace will illustrate some fundamental design of combustion chamber. It is of interest to mention that recently some work has been done by others concerning the quantity of radiant energy adsorbed by various shaped combustion chambers. However, it requires the use of photographic film and a point source of radiant energy and does not compensate for the fact that in actual operation of a combustion chamber the same material which adsorbs radiant energy also emits radiant energy.

Although details of this study have not been completely formulated or approved by the Technical Advisory Group, it is proposed to select furnaces that will be operated at approximately the same input rate so that burners may be interchanged from one to another. In this manner it should be possible to correlate burner design to combustion chamber design. Mathematical data taken will consist chiefly of flue loss determinations, but some actual efficiencies will be calculated whenever trends in the study indicate such data to be necessary. In addition to gathering flue loss data a study of burner and pilot operating characteristics will be made. Horizontal and vertical positioning of the burner and its relationship to flue loss will be investigated. Changes in quantity of excess air and its effect on burner and furnace performance will be noted and research conducted on effect of methods of secondary aeration and its control. During these tests observations of noise produced by various changes in aeration and burner positions will also be recorded. Data will be correlated and presented in a manner to indicate practical application limits for all of the variables studied.

Part II. The Gas-Fired Summer-Winter Hook-Up

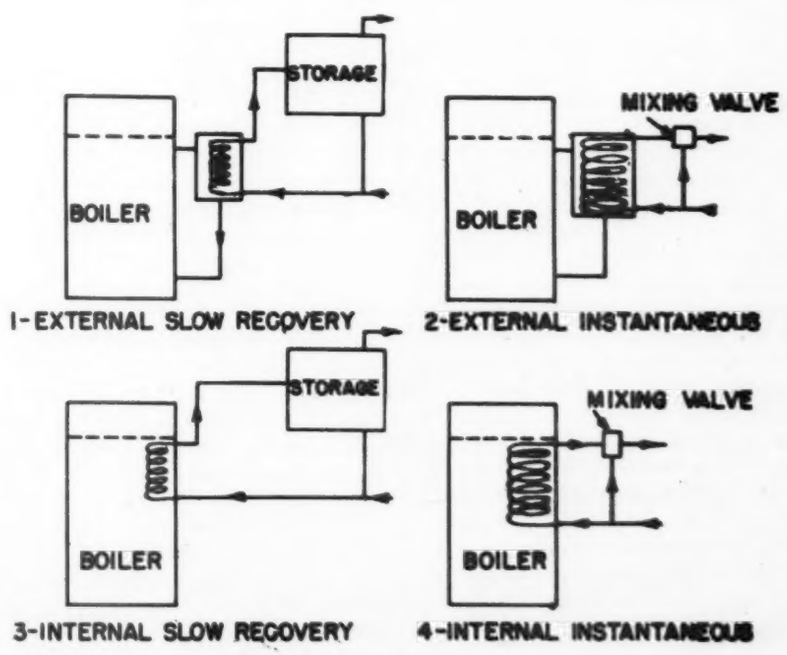
Indirect water heating has been used to provide hot water in industrial and commercial installations for many years. However, it is only during the last few years that this method of water heating has become popular for use in conjunction with domestic steam and hot water central heating systems. This increased acceptance of indirect water heating came about primarily as the result of greatly increased oil-fired boiler sales, although generally accepted theory had stamped the Summer-Winter Hook-Up as relatively inefficient. In spite of previous experience and prejudices it was found to be less expensive than using a separate gas-fired automatic storage water heater in conjunciton with an oil-fired boiler. Gas water heating rates are sufficiently high in most areas where appreciable quantities of fuel oil are sold that an oil-fired Summer-Winter Hook-Up can compete on a year-around cost basis. The method of billing for fuel oil deliveries is also phychologically adaptable to this type of water heating. For example, it is only in rare cases that a full tank of oil is used for summer water heating and since bills are rendered with each tank filling the customer's attention is not focused on the cost of hot water by monthly billings. Furthermore, a steady supply of hot water is provided with a single unit and hence with a maximum of convenience.

This trend toward Summer-Winter Hook-Ups was observed by alert minds in the gas industry. Since, as shown by sketches in Fig. 3, the Summer-Winter Hook-Up is not physically affected by the type of fuel used, these individuals were soon inquiring into possibilities of using it with gas-fired equipment. Several efforts were made to interest various appropriately equipped organizations in making an investigation. Attempts to use gas with the Summer-Winter Hook-Up first came to the Laboratories' attention in 1933. After due consideration it was determined that the particular unit in question would probably be unable to meet existing approval requirements for gas-fired water heaters. The subject was not pressed beyond the inquiry stage.

Lack of interest displayed at that time by the gas industry as a whole can be attributed to several factors. First, practically all interest observed was centered in the northeastern United States. Secondly, the volume of gas-fired boiler sales was small in comparison to total boiler sales. Finally the art of gas boiler design had been advanced in these areas to provide small, streamlined highly efficient units. This type of equipment produced quick heat with minimum use of fuel and space. Introduction of the Gas-Fired Summer-Winter Hook-Up involved a complete change of design for such units in order to provide room for a hot water coil. Even in larger units the minimum change required was a redesigned end section.

In view of these conditions it is not surprising that gas boiler manufacturers were not especially enthusi-

Figure 3:—Four general types of Gas Operated Summer-Winter Hookups.



astic about making the necessary modifications in their products. In spite of their unwillingness to change, some manufacturers had experimented with the Gas-Fired Summer-Winter Hook-Up and a few had even included provision for its optional use. For example, it is necessary on a steam boiler to provide top water circulation below the water line when a hot water coil is used. This often necessitates drilling and tapping each section for installation of an external header. In some cases center punched bosses were provided on the rear of sections to facilitate this operation. Even with this innovation it was still generally necessary to mount the water heating coil external to the boiler. A field survey conducted by the American Gas Association Testing Laboratories indicated that all but the newest units were equipped with externally mounted water heating coils. It was also noted that these older systems consisted almost exclusively of boilers designed for use with coal or oil, but heated with a gas conversion burner. Furthermore, some of these boilers had never been operated on the fuel for which they were designed but had been installed originally for use with a gas conversion burner.

In 1940 new experiments were undertaken by one of the eastern utilities in conjunction with a boiler manufacturer. After considerable laboratory work several of the new units were placed in homes in the territory served by this utility. After a season's operation it became apparent that these units were satisfactory and that a demand for them was growing. For this reason a unit was submitted to the American Gas Association Testing Laboratories for test and approval. However, before preliminary observations were completed the war intervened and the subject was dropped.

In the fall of 1942 users of oil-fired equipment found themselves faced with an oil shortage. As a result there was a concerted rush to obtain gas conversion burners. This situation continued until controls were imposed on the use of gas fuel and the supply of conversion burners became exhausted. As previously mentioned most oil-fired boilers are equipped for use with the Summer-Winter Hook-Up and since a good many of these boilers were converted to gas some utilities found themselves with several hundred combination units on their lines.

Most of the larger gas companies thus affected recognized an opportunity to study the Summer-Winter Hook-Up without the usual preliminary efforts. Considerable operating data were obtained which emphasized the fact that most of these converted oil-fired installations were rather inefficient. Meanwhile in an area where about 1000 gas designed experimental Summer-Winter Hook-Ups were installed a somewhat different story was unfolding. In this instance test experience and engineering accumen had pointed out the need for heavier insulation and carefully supervised installation procedure. As a result these installations were much more efficient than the converted units. These experimental results were published in two different reports and considerable interest was aroused among northeastern utilities and boiler manufacturers.

A considerable quantity of operating and cost data were collected during the Laboratories' field survey. Although a complete analysis of data obtained is not yet available several conclusions can be drawn from obvious trends. For example, it can be safely stated that the experimental boiler specifically designed for use with the gas-fired Summer-Winter Hook-Up is more efficient than oil or coal fired boilers converted to gas. However, in comparison of the gas-fired experimental boiler with a separate automatic storage water heater, problems of rate structure and methods of calculating losses enter into the picture. Until a complete analysis of data can be made it can only be said that there is probably little difference between the two methods insofar as operating costs are concerned. It must be remembered in accepting this statement that a gas-fired Summer-Winter Hook-Up must be well insulated, carefully designed and installed strictly according to the manufacturer's printed instructions in order to approach performance of most automatic storage water heater installations.

From a utility point of view the installation of gas conversion burners in Summer-Winter Hook-Ups provided an excellent opportunity to study the effect of this type of equipment on their own operating problems. For instance, it was noted that a service man with better than average training was needed to maintain these units. This was true not only from a mechanical point of view but also from a psychological standpoint. It was also found that boilers operated the year around were less prone to scaling and corrosion difficulties. Also, servicing was no longer a seasonal problem as was that occasioned by equipment which it was necessary to clean and light each fall. Another pleasing feature was the dry basements in homes served by a Summer-Winter Hook-Up.

On the adverse side it was found that by far the greatest source of difficulty was the mixing valve used to temper the domestic hot water. Most installed units were equipped with a type that was generally unreliable. However, manufacturers are directing much effort toward improving these mixing valves and it is anticipated that satisfactory units of comparable cost will be available shortly. Hard water areas are a source of much trouble, but as these difficulties are by no means exclusive to the Summer-Winter Hook-Up it does not seem reasonable to consider them as a serious factor in this discussion.

There are a few installations of the Summer-Winter Hook-Up in the eastern United States that are rather unusual and impractical for use in large metropolitan areas. This type of system consists of an instantaneous water heater equipped with a circulating pump and convectors for house heating, together with a mixing valve and cold water intake to provide domestic hot water. In some cases a check valve and pressure sensitive controller are used to prevent excessive mixing of heating system water, and to shut down the circulating pump when domestic hot water is drawn. In others the circulating pump is actuated by the house heating thermostat and withdrawal of domestic hot water has no effect on the system until the water temperature is lowered sufficiently to cause a reverse acting aquastat to shut down the circulating pump. The laboratories investigated both systems in the field and found that each gave satisfactory results except for some minor difficulties. Since both systems permit mixing of sanitary and heating system water their use would be prohibited in most populous areas.

When the war came to an end various interests came forward with definite programs to promote acceptance of the Gas-Fired Summer-Winter Hook-Up. In view of this awakened interest the previously mentioned field survey conducted by the laboratories was also concentrated on determination of consumer opinions. Sixteen units selected at random were inspected. A few complaints were received from customers interviewed. Most of these were due to faulty control or poor installation.

(Concluded on page 62)

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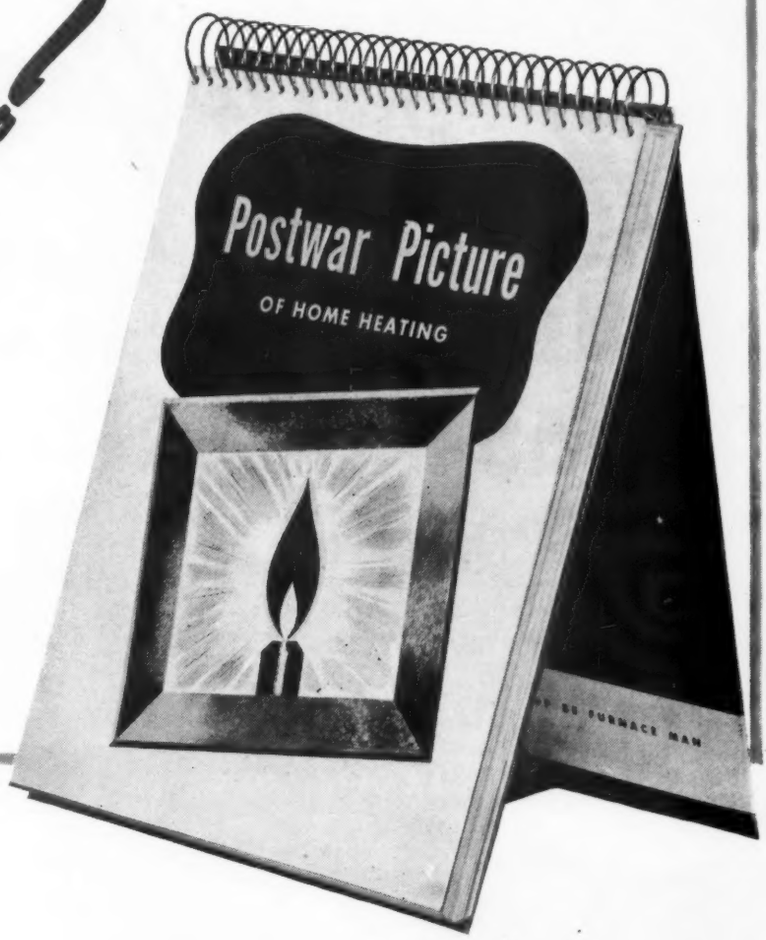

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RECENT COURT DECISIONS
Affecting Gas Utilities

Review New Law Suits Involving Gas Statutes

By
Leo T. Parker
Attorney at Law
Cincinnati, Ohio

SELDOM do the higher courts render so many interesting and informative decisions involving gas statutes as have been rendered during the past few months. Knowing the cause and outcome of these outstanding and new law suits will assist readers to avoid similar legal controversies, and also these leading higher court citations may be used to win favorable verdicts in unavoidable law suits.

Readers who desire all details of any briefly explained law suit may readily refer to a specific citation, and read the complete decision in any good library.

Gas Rate Basis

It is true that validity of gas rates is based upon statutes. However, modern courts recognize that in the field of rate-making, the decisions of the United States Supreme Court must be necessarily relied upon. In Bangor Water Company v. Public Service Commission, supra, 82 Pa. Super. 48, 55, this court said:

"The decisions of the Supreme Court of the United States require us to base the fair return upon its present value; that is, its reasonable value at the time it is being used for the public."

For illustration, in Pennsylvania Public Utility Commission v. Peoples Natural Gas Company, 44 Atl. (2d) 614, reported December, 1945, the Public Service Commission approved a gas rate base of a specified sum and allowed a return of six and one-half per cent on such base. In this case it was shown that the gas company had drilled wells and made other additions to its property but on its books had charged these additions to expense of operation. The higher court held that the Commission properly refused to consider such items as additions to property affecting the rate base, since the company by disbursing part of its earnings as operating expense recouped the cost from gas consumers. The higher court held that, under these circumstances, the gas company could not later be permitted to state that such expenditures were "capital" investment on which gas consumers must pay an additional return.

However, this higher court indicated that the gas company's rate of return of six and one-half per cent is not unreasonably high and should not be reduced merely to compensate for a relatively high finding of fair value upon which the rate was to be applied. This court said:

"In our former opinion we said that a rate of return of six and one-half per cent was not unreasonably low; we are not now in position to say that it is unreasonably high as applied to a utility whose sole product is natural gas."

Also, this court said further:

"It is important that another gas company in the Pittsburgh area may be serving consumers at rates lower than those approved by the commission in the present case. What a utility may be entitled to earn is a question to be decided in each particular case and is not governed by an over-all-end judgment of what companies of the same class ought to charge the consuming public for their product."

Law Held Confiscatory

Two unusually important points respecting gas rate statutes were decided by a United States Court in the leading case of Queens Borough Gas & Electric Company v. Prendergast, 31 F. (2d) 339.

The facts of this case are that a state's legislature enacted a law many years ago limiting the rate chargeable by gas companies in cities, having a population over 1,000,000, to $1 per 1,000 cubic feet and the quality of the gas was specified. The price permitted outside the city was considerably higher.

A gas company contested the validity of the old law on the grounds that a portion of its customers served live in the city and other portion are in an adjoining county. Furthermore, it proved that the present cost to produce gas is about equal to the price which it is permitted to charge for gas sold to consumers in the city.

It is important to know that the court held the statute invalid on the grounds that it confiscated property without just compensation. It was also held that the gas company was not required to prove the exact apportionment of operating costs within the city and the adjoining county.

Not Nuisance

Modern higher courts consistently hold that a Public Service Commission duly authorized by valid state laws may designate the location of gas tanks and approve their construction and maintenance, irrespective of contentions to the contrary by nearby property owners who fear the tanks may explode.

For example, in Automatic Gas Company v. Dudding, 189 S. W. (2d) 780, reported December, 1945, a property owner filed suit against the Automatic Gas Company to enjoin it from constructing and maintaining its butane gas reservoirs near his residence. The property owner alleged that the building and operation of and maintaining this violent explosive in close proximity to his residence is a constant menace to the safety and welfare of the occupants of his home, and it sets up a reasonable fear in the minds of the occupants that an explosion may occur at any time.

During the trial the gas company proved that the Public Service Commission was duly appointed and authorized by valid state laws to designate where gas tanks shall be located. Also, the testimony showed that the Commission had approved the tanks as being safe and had also approved all equipment and safety devices used in connection therewith.

The lower court granted an injunction against construction and maintenance of the dangerous tanks in close proximity to the residence. However, the higher court reversed the lower court, saying:

"The rules and orders of the Commission regulating the storage and distribution of liquid Butane Gas are in conformity to the statutes, are legal and have the force of law. . . . Under such circumstances we must conclude that the trial court was without authority to declare the erection of appellant's tanks on the proposed location a nuisance."

Commission Has Authority

In City of North Miami Beach, Fla., v. Federal Water & Gas Corporation, 151 Fed. (2d) 420, reported January, 1946, a state law was litigated which committed to the Securities and Exchange Commission's judgment and discretion the question of divestment of public holding companies of their interest in public utilities. The higher court upheld the validity of this law saying that the appointed Commission must act reasonably.

Commission Reduces Debt

In Massachusetts Mut. Life Ins. Company v. Securities and Exchange Commission, 151 Fed. (2) 424, reported January, 1946, the higher court held that the retirement of the bonds issued by a holding company, with or without premium redemption provision, is within the power of the Securities and Exchange Commission in a reorganization proceeding.

In this case the reduction of the indebtedness of an operating gas company, not a holding company, was the direct result of an order of Securities and Exchange Commission.

Law Explanatory

In Thompson v. United Gas Corporation, 190 S. W. (2d) 504, the higher court held that a corporation engaged in the business of distributing gas at retail and to consumers is *not* a company "owning, operating or managing pipelines" within the Natural Gas Utility Act.

Also, this court held that a company which "distributes" gas is not subject to license fees imposed on pipeline utilities.

What Is Franchise?

The words franchise, privilege, consent, grant, and the like, are used synonymously. Each word may have the identical legal meaning of any of the others, providing such is the intention of the law making body, or interested parties sign an expressed or implied contract containing an expression.

A valid "exclusive" franchise conveys to the gas company a monopoly to carry on and transact its business free from competition in a restricted area for a predetermined period. However, the word "exclusive" is never presumed.

For illustration, a recent leading higher court (299 S. W. 355), said that when gas corporation officials allege that a state or city council have surrendered power of "improvement and public accommodation," to an exclusive franchise such fact ought not be presumed where the deliberate purpose of the state or council do not appear certain.

In this case the court held a city ordinance valid which granted rights to a competitive gas corporation to supply gas to the inhabitants, although the original gas company had for many years acted under belief that it held an exclusive franchise and paid to the municipal corporation a percentage of its profits and also had supplied gas, without charge, to the municipal buildings in consideration of its having an exclusive franchise.

On the other hand, if a municipality has power to grant an ordinary franchise, and a gas company expends considerable money and installs equipment in good faith without having a franchise by authority of the municipality, the latter will be denied the right to question the privilege of the gas company to use the streets, providing such use of the streets does not violate statutory or charter requirements.

In other words, generally a municipality cannot successfully contest the ordinary right of a gas corporation to continue operation of its business, where the former has acquiesced for many years in the use of its streets by the company and the inhabitants have received the benefits of the use. However, such is not the law with respect to exclusive franchises.

In the case of City v. Citizens, 166 U. S. 557, in discussing this subject of ordinary franchises the Supreme Court of the United States in effect said:

"All that is necessary for a public service company to retain its rights is to show that, upon the faith of a certain action on the part of the city, which it had power to take, the company incurred a new liability; as, for example, by the negotiation of a new loan, and the issue of a new bond and mortgage to secure the same."

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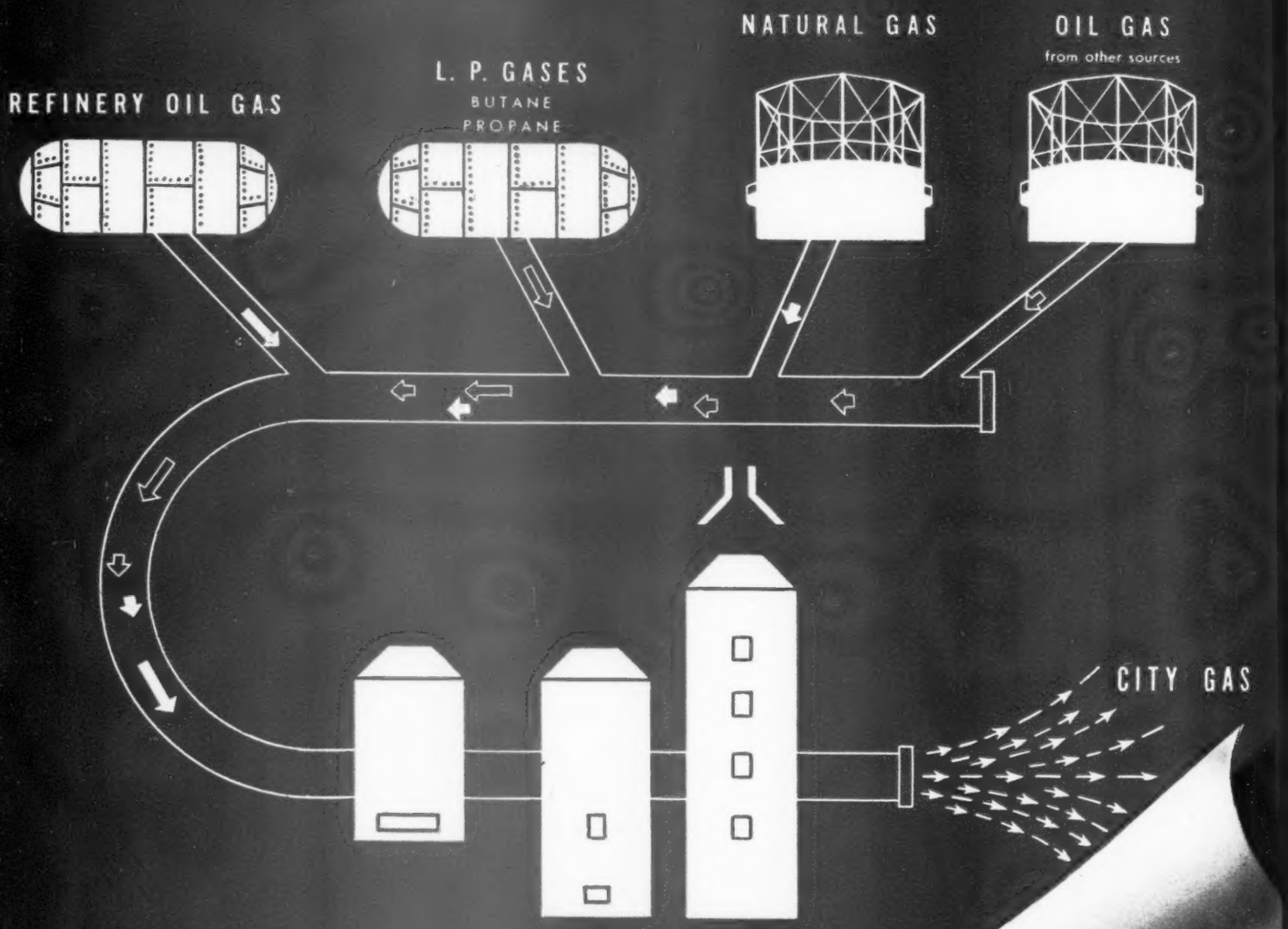

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NEW YORK PHILADELPHIA CHICAGO

National Metal Exposition Attracts Record Attendance

A MAJORITY of the more than 45,000 visitors to the National Metal Congress and Exposition, Cleveland, stopped to admire the attractive Industrial Gas Center with its unique eye arresting mechanical gas "flame" during the week of February 4 to 8. This jointly sponsored exhibit of The East Ohio Gas Company and the American Gas Association was the focal point of industrial gas sales engineers and gas equipment manufacturers.

Harry A. Sutton, Public Service Electric & Gas Co., Newark, N. J. and Karl Emmerling, The East Ohio Gas Company, Cleveland, Chairman and Vice Chairman, respectively of the Industrial and Commercial Gas Section, American Gas Association, welcomed visitors from all parts of the country to The Industrial Gas Center. The exhibit was tastefully done in a blue and white motif with a background of photo enlargements of gas fired industrial installations flanking an illuminated "trend" chart.

THE INDUSTRIAL GAS CENTER AT THE METAL EXPOSITION.

Scattered throughout the three floors of the exhibition area were the operating exhibits of industrial appliance manufacturers, which featured specific applications of gas fired industrial heating equipment.

The American Gas Furnace Company, Elizabeth, N. J., demonstrated their various types of industrial gas burners. There was a unique demonstration which dramatically illustrated the principle of high-speed gas heating.

Newcomers in the industrial heating field, Bryant Heater Company, Cleveland had an operating gas fired burner illustrating typical gas combustion equipment. Their Flomixer is a device which utilizes a stream of air at several pounds pressure to entrain combustible gas and deliver the mixture at unusually high pressure at the burner.

The feature of the presentation of the Gas Appliance Service Inc., Chicago as demonstrated by E. A. Furkert, was an automatic gas fired machine for continuous production line silver soldering.

High-speed paint drying in a convection oven was demonstrated by the Despatch Oven Company, Minneapolis with the use of small metal trays. The process demonstrated, started with the dipping of the trays in paint, various colors were used, then they were transferred to an electrostatic detearing unit and on to a conveyer which carried them through a gas fired convected air oven, coming out completely dry. The entire operation from start to finish was concluded in a matter of minutes.

Being a local organization The Gas Machinery Company, Cleveland, took advantage of their proximity to the exhibition hall to have hourly trips to their factory where an atmosphere controlled roller hearth furnace was set up to demonstrate silicon carbide radiant burner tubes capable of developing temperatures up to 2500 deg. Trip after trip was arranged by Mr. Harmon at the exhibit to accommodate the many visitors, prospects and customers who wished to see that particular type of equipment under actual operating conditions which was demonstrated by Ken Stookey.

Among the many pieces of gas fired industrial heating equipment in the large exhibit of the Lindberg Engineering Co., St. Louis, was a new gas cracking unit. This gas fired apparatus is used to make precision controlled atmospheres for various types of heat treating.

North American Manufacturing Co. of Cleveland was showing for the first time their new nozzle mix aspirated burner for industrial furnaces. The salient point of this burner is that it can be used within a wide range of Btu. input yet maintaining a constant air-gas ratio.

A completely automatic gas fired flame hardening machine attracted widespread attention at the exhibit of Selas Corporation of America, Philadelphia. For purposes of demonstration, ball peen hammer heads were flame hardened by a series of gas flames in 17 seconds and then automatically carried through a quench.

The National Metal Congress and Exposition was the largest ever held by the American Society for Metals. Many wartime secrets were revealed for the first time by a number of exhibitors. It was striking to note that much emphasis was laid on the possibilities of the light metal alloys, particularly aluminum and magnesium alloys. New stainless steels of super alloys for jet engines were also given prominent place and new fields for chrome were demonstrated which promised new markets in the chemical, mining, petroleum and rubber industries. New equipment to enhance production in the metalworking industry was shown for the first time.

New equipment, new processes, new applications presented a vista

The Industrial Gas Breakfast, Hollenden Hotel, Cleveland, Ohio, February 6th.
On the left, left to right: J. P. Leinroth, C. B. Phillips, E. L. Shaner, H. A. Sutton.
On the right, left to right: Dr. George B. Waterhouse, Professor Emeritus, Massachusetts Institute of Technology, Cambridge, Mass., Karl Emmerling, R. W. Ramsdell, P. C. Osterman.

for the increased use of gas in industry where heat is the principal part of processing. Industrial gas sales engineers are cognizant of the opportunities offered in their field, and they will be the cogs in the wheel that will perpetuate the gas industry slogan—The Trend Continues to GAS.

The Industrial Gas Breakfast

Promptly at 8:30 A.M., February 6th at the Hollenden Hotel, Cleveland, some 150 gas men sat down with 15 editors and representatives of the leading metals magazines at the traditional Industrial Gas Breakfast which has for nine years been a regular feature during National Metal Expositions.

The breakfast was presided over by Harry A. Sutton, Public Service Electric & Gas Co., Newark, N. J., Chairman of the Industrial and Commercial Gas Section, American Gas Association.

The first talk was given by Dr. George B. Waterhouse, Professor Emeritus of Metallurgy, Massachusetts Institute of Technology. As past president of the American Society for Metals, he welcomed the guests on behalf of the National Metal Congress. In his talk, Dr. Waterhouse traced the history of the use of gas in steel making from early English open hearths up to the present time. He also described the many uses of gas in the various phases of steel processing operations, hardening, tempering, carburizing, nitriding and other applications using special atmospheres.

Following Dr. Waterhouse, Mr. Sutton next introduced Mr. E. L. Shaner, Editor-in-Chief of *Steel*. This well known engineer and publisher gave the assembled guests a short background of the achievements in metallurgy, and suggested the new environment in which metallurgists will be working during the postwar period. He paid tribute to the contributions that metallurgists made to the war effort and how those contributions would auger to the benefit of industry now.

Mr. Shaner continued with the assertion that one of the essentials of industry was to establish new, and expand present research facilities. He informed his listeners that here in the United States there was an acute demand for 100,000 technically trained men to help refill the depleted reservoir of technical knowledge.

In conclusion, Mr. Shaner left the breakfast guests with the thought that in addition to pursuing our responsibilities in the technical fields, we should give serious consideration to our responsibilities as citizens. He said: "If we, as citizens, will fight for the preservation of this system, (free enterprise) our nation may be able to lead the weary world back to a condition of lasting peace, stability, and a higher standard of living."

Immediately following the breakfast, meetings of the Committee on Heat Treating and finishing with Gas and the Non-Ferrous Metals Committee were held under the leadership of Charles C. Eeles, The Ohio Fuel Gas Company, Toledo and C. George Segeler, American Gas Association, respective Chairmen of the committees.

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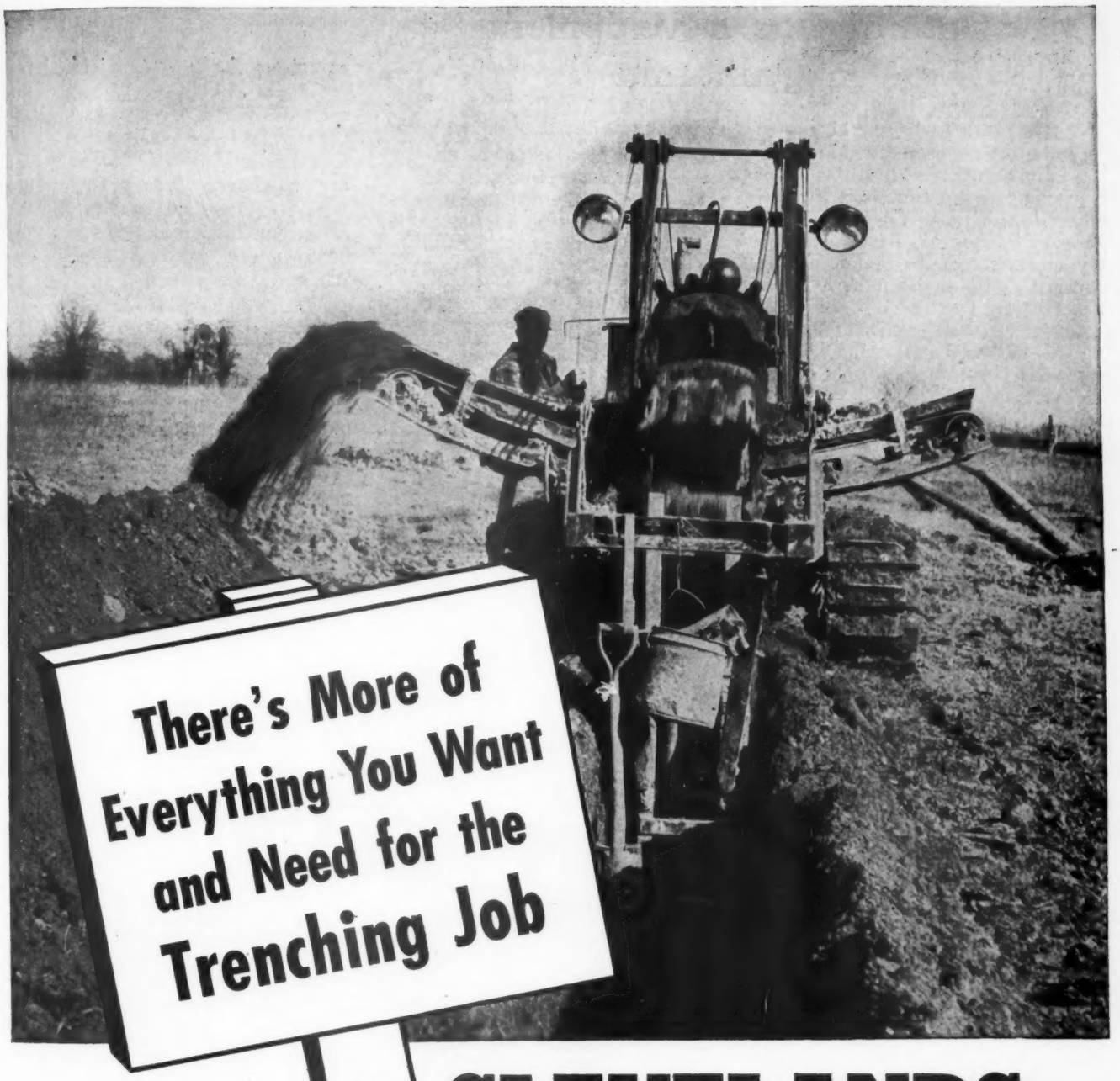

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Natural Gas Development in California

HIGHLIGHTS in the history of the development of natural gas in California were presented at a meeting of the American Electro-Platers' Society at Los Angeles in January by Roy M. Bauer, gas supply supervisor of the Southern California Gas Co. and Southern Counties Gas Co.

Mr. Bauer undertook to explain the reasons why gas companies are compelled occasionally to shut off the gas of industrial clients in order to meet the demand of domestic users, prefacing this part of his address with a history of the industry.

The size of the natural gas business in California and the problems encountered in this particular section of the country, he said, are not fully known except to those associated in the industry.

"The natural gas business is big business in California," Mr. Bauer said. "From a few million dollars invested prior to 1908 the industry has grown to a giant with a $360,000,000 investment in 1944, with revenues exceeding $110,000,000, pipelines totaling 25,500 at the end of 1944, and customers aggregating a total of 2,100,000."

California rose from the bottom of the list among states engaged in natural gas production and distribution to first position by 1935, according to Mr. Bauer.

"Natural gas was first used for commercial fuel in California about 1894," he said. "But it remained for the Santa Maria Gas Co. in 1907 to be the first gas utility to distribute this useful product. The discovery of the great gas and oil producing areas in the Buena Vista Hills, near Taft, opened up a new era in Southern California history. In 1912, a 12 inch natural gas pipeline was started over the Tehachepi Mountains toward Los Angeles, and on April 28, 1913, the first natural gas was delivered to Los Angeles."

Mr. Bauer explained that in 1914 natural gas developments in the eastern portion of the Los Angeles Basin were undertaken and in December, 1915, the first Los Angeles Basin gas from the Coyote field was delivered to Los Angeles.

"From the oil operator's point of view the production of oil was of primary concern and natural gas in the early days was regarded as a considerable nuisance and was wasted away without regard to the future. Since 1931 conditions have changed materially with respect to unconserved gas."

Mr. Bauer declared that the development of the great Kettleman Hills gas and oil field in 1928-29 led to natural gas being introduced into the San Francisco area in August, 1929.

"Until recent years," he said, "nearly all of California's natural gas production has been oil well gas. The association of natural gas and crude oil is so close that we cannot consider them separately. California gas and oil fields have become famous the country over for their prolific production, depth of producing formations, great thicknesses of producing sands and tremendous reservoir pressure."

Mr. Bauer stated that Southern California continues to obtain over 95% of its gas from oil wells and underground storage reservoirs.

In the second part of his address Mr. Bauer, explained by means of charts and diagrams, the rises and falls in seasonal demands and how changes in weather affect the load.

"Weather," he said, "plays a major role in creating gas customer demand, which accounts for the seasonal changes which occur during extremely cold periods." At times, he explained, the hourly gas demands are so heavy during the winter period—November to March—that all surplus industrial customers must be curtailed in order to take care of the firm customers.

Mr. Bauer demonstrated through charts that the gas supply available to the Los Angeles utilities was fairly constant during the war period subsequent to the middle of 1942, in spite of the increased crude oil and total gas production. Following the end of hostilities in August, 1945, and by the end of 1945, he said, crude oil production dropped to about 830 MB/D, and the net available to the gas companies declined correspondingly to about 560,000 M/D.

"More than 83% of California's 8,800,000 population use natural gas as a primary fuel," Mr. Bauer said in conclusion. "Active meters at the end of 1945 totaled approximately 2,150,000 domestic and commercial, and 5,500 industrial."

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CHAPTER III

Oil Fired, Recovery Water Heaters or Boilers

(a) General.

AUTOMATIC, Oil Fired Water Heaters suitable for employment as recovery water heating units in conjunction with separate, hot water storage tanks may be divided into four general classifications.

The Vertical Type of automatic, oil-fired storage water heater may be employed as a recovery water heater in conjunction with a separate, hot water storage tank although it may also beu sed as a self-contained, automatic, storage water heater.

The Horizontal Type of automatic, oil-fired water heater may also be classified as a *Water Heating Boiler* designed specifically for oil combustion.

Vertical or Horizontal hot water or steam boilers—usually of steel construction — which are designed specifically for oil combustion.

Vertical or horizontal hot water or steam boilers—of either steel or cast iron sectional construction—which are designed for *Coal-Firing* but which may be adapted to *Oil-Firing* by the installation of an oil burner and refractory combustion chamber lining together with the necessary automatic controls.

(b) Direct, Oil-Fired, Automatic, Large Volume Water Heater.

Direct, oil-fired, large volume water heaters or oil designed boilers may be of either the *Vertical Type* or the *Horizontal Type*. Either type may be operated as a self-contained, automatic storage, oil-fired water heater where the capacity of the hot water storage tank or jacket in the unit is adequate to meet the excess of hot water demand over the recovery capacity of the oil burner. Either type may likewise be employed as a recovery water heating unit in conjunction with a separate, hot water storage tank.

In the Vertical Type, the heat of the connection currents of hot flue gases in transmittal to the water in the heater tank by direct conduction through the bottom of the tank and the walls of the multiple, vertical flues or tubes in the tank.

The Horizontal Type is frequently of the two pass type in which the flue gas passages are so designed that the hot flue gases travel from the firing end of the heater to the opposite end at one level and return to the firing end at a higher level before emerging to enter the flue-pipe. In this type, the heat of the flue gases is likewise transmitted to the water surrounding the flue gas passages by direct conduction.

Controls. When operated as a self-contained, automatic, storage water heater, control of the water temperature is accomplished by means of a direct acting aquastat, which functions as described in Chapter 1.

Aquastats of this type generally operate on a temperature differential of approximately 12°, F.

Operating safety is accomplished as described in Chapter 1.

Operation as a Recovery Water Heating Unit

When an *Automatic, Oil-Fired,* water heater or boiler is installed in conjunction with a separate, hot water storage tank to provide an increased reserve of heated water to meet excessive peak demands, the direct acting aquastat *must* be installed in the separate, hot water storage tank as described in Chapter II.

When a direct-acting aquastat is installed in the separate, hot water storage tank to control the water temperature in the system, a *second* aquastat — of the *Reverse Acting Type*—should be installed in the tank of the heater or boiler and connected into the electrical circuit feeding the oil burner motor. This reverse-acting aquastat then functions as a high limit control to *shut-off* the oil burner motor when the water in the heater tank reaches the *maximum*, predetermined temperature above which the temperature relief would function and waste heated water.

It is also desirable to limit the temperature of the hot water delivered to the separate hot water storage tank to a pre-determined maximum in order to prevent stratification of the hot water in the upper portion of the storage tank at a temperature greatly in excess of that which is to be maintained in the storage tank. Under the circumstances it is recommended that the reverse acting aquastat in the heater tank be "set" to *open* the electrical circuit, shutting-off the oil burner when the water in the heater tank attains a Temperature of 190°, F.

Safety Protection. For description of approved types of pressure and/or temperature relief valves and instructions covering required capacity of such equipment, refer to Chapter IV, which will follow.

Vertical or Horizontal Hot Water or Steam Boilers Converted To Oil Combustion and Operating As Recovery Water Heating Units

The conventional type of coal-fired water heating or steam boiler, either vertical or horizontal may be converted more or less successfully to oil combustion by the installation of an oil burner of adequate capacity and necessary controls and the installation of refractory material in the combustion chamber of the boiler to provide a chamber of the correct design and dimensions after removal of the coal burning grates.

Steam Heated Recovery Water Heating Systems

(a) General

Steam-heated, recovery, water heating systems are of two basic types—the Self-contained, steam heated, Hot Water Generator in which the steam heating coil is immersed directly in the hot water storage tank,—and the typical Recovery Water Heating System employing a standard, vertical or horizontal, hot water storage tank and separate, steam-heated water heating unit of the Instantaneous Type.

(b) Steam Heated, Self-Contained, Hot Water Generators

While the Automatic Hot Water Generator of this type may be considered as conforming to the description of an automatic, single-unit, storage water heater, it also may be classified as a Recovery Type of water heating system in that the storage capacity of the tank may be much greater in proportion to the recovery capacity than is practicable in a typical, pre-fabricated, automatic storage water heater employing Gas, Fuel-Oil or Electricity as a heating medium.

For installation in a vertical position the steam heating coil unit enters the tank through an opening in its lower side and the steam immersion heating coils, or "U" shaped sections, are necessarily shorter but usually more numerous in order to obtain the equivalent area of heating surface. The heat of the steam within the tubes of the heating element is transmitted to the water in the tank by direct conduction.

Condensate is piped from the bottom outlet of the heater of the heating coil unit to a conventional type of steam trap from which it is returned to the boiler or, in rare occasions, wasted.

Automatic control of hot water temperature is described in Section 5 Chapter 1.

Capacity. The Recovery (Water Heating) Capacity of Steam Heated, Copper Tubing Coils immersed in Water is set forth in Section 5, Chapter 1.

For detailed information covering the Recovery Capacity of Immersion Steam Heating Coils with Capacity Table (see Figure 2, Chapter 2) and also covering a third factor which influences this Heating Capacity, refer to Chapter 1, Section 5.

For information on methods of increasing the recovery capacity of these generators refer to Chapter 4, to follow, which will include installation diagrams and directions.

(c) Steam Heated, Recovery Water Heating System Employing Separate Heater and Hot Water Storage Tank.

These systems employ a steam heated, indirect type of water heating unit in conjunction with a conventional type of hot water storage tank, either vertical or horizontal. In the heater in this type, the water is contained in, and circulates through the Shell, or Jacket of the heater and the steam through the Copper Tubing Coils. The heat of the steam within the Coils is transmitted, by direct conduction, to the water surrounding the coils in the shell of the heater.

Where the recovery circulation between the heater and the hot water storage tank employs gravity action to accomplish movement of the heated water, the heater must be so located that its top is *below* the level of the bottom of the storage tank. This is particularly essential if the Recovery, Water Circulating Lines between the Heater and Hot Water Storage Tank are under sized or if an excessive number of elbows are used. (See Chapter 1,—3C).

Controls. Automatic control of hot water temperature is accomplished by means of an Automatic, Steam Control Valve as described in Chapter 1, Sec. 5.

Capacity. The recovery capacity is outlined in Chapter 1, Sec. 5.

For information covering methods of increasing recovery capacity systems, refer to Chapter IV, to follow.

For installation diagrams and directions covering the installation of these Systems refer to Chapter IV, to follow.

Coal Fired Recovery Water Heating Systems

A typical Coal, Hand-Fired, Water Heater or Water Heating Boiler will function as a recovery water heater in conjunction with hot water storage tanks.

The majority of heaters of this type are round and may be of cast-iron or steel construction. Cast-iron, sectional boilers may be employed as water heating boilers *provided* such boilers are A.S.M.E. approved for operation on a *minimum* water pressure of 100 pounds per square inch.

Note—Do Not use cast-iron, sectional boilers approved *only* for operation at a steam pressure of 15 pounds and/or a water pressure of only 30 pounds p.s.i. as the working pressure of the water system will invariably be above those limits and operation would be hazardous.

In all water heaters or water heating boilers of this type, regardless of shape or material, the heat of combustion is transmitted by direct conduction through the walls of the combustion chamber or fire-pot to the water in the heater or boiler jacket surrounding the combustion chamber.

The water in the heater or boiler jacket, when heated, rises and flows to the top of the hot water storage tank through the hot, discharge, recovery circulating line connected to the uppermost part, or dome of the heater and is displaced by cooler water from the lower zone of the storage tank through the return, recovery, circulating line connected to a tapping, or manifolded to two tappings in the heater or boiler at the level of the lowest part of the water jacket.

Control. Control of hot water temperature in the system is manually accomplished by regulating the coal firing rate to accommodate periods of peak hot water demand, by banking the fire during extended periods when little, if any, hot water demand exists and by manipulation of the ash-pit draft, the check-draft and the over-fire draft check or accelerate the draft to the burning coal-bed as required.

Partial automatic control of the *rate* of combustion in such heaters may be accomplished by employing a so-called draft control unit installed in the hot, discharge, recovery circulating line between the heater and hot water storage tank at a point as close to the heater as possible. A *rise* in water temperature, above a selected, pre-determined point, serves to expand a bellows or metallic diaphragm or, conversely, to contract the bellows upon a *drop* in water temperature in the line. This expansion and/or contraction serves to operate a balanced arm or lever to the opposite ends of which are attached chains fastened to the ash-pit damper and check draft doors, respectively. Expansion of the thermal element serves to *open* the check draft and, at the same time, *close* the draft in the ash-pit door.

Upon contraction of the thermal element the reverse cycle occurs. *Note*—It is inadvisable to install this type of draft control directly in the top of the heater or boiler as water temperature of approximately 210°. F., will frequently serve to rupture the bellows or diaphragm and render the unit inoperative.

Fully Automatic Control of combustion and, consequently, of hot water temperature in coal-fired water heaters or boilers can be accomplish-

ed *only* through the employment of automatically controlled, mechanical coal stokers.

Safety Protection. For description of approved types of pressure and/or temperature relief valves and instructions covering required capacity of such equipment, refer to a following chapter.

Capacity. The recovery (Heating) capacity of coal-fired units in gallons of water raised a *given* number of degrees, F., in temperature in *one hour*—is directly proportional to the weight of coal which can be properly and efficiently burned in the heater or boiler in *one hour.*

Since the area of the grate determines the rate at which coal can be properly and efficiently burned, it is equally true that the recovery (Heating) capacity is likewise directly proportional to the grate area.

In many instances, unfortunately, the published capacity of various types and sizes of coal-fired units have apparently been based upon a theoretical factor, or factors, other than the weight or volume of coal which can be burned under normal, existing firing and operating conditions—and, as a result, have, at least inferentially, resulted in the installation of heaters or boilers which were incapable of supplying hot water at the published rate or of meeting the specific hot water demand which they were expected to supply.

In order to eliminate the use of possibly erroneous, published water heating capacity ratings when estimating or determining the type or size of water heater or heating boiler necessary to adequately supply a given hot water demand, a table will serve as a guide in determining the type and/or size of coal fired water heater or water heating boiler—based upon grate area—which will be required to supply any given hot water demand.

This Table, Figure 3, Chapter 2* shows the number of gallons of hot water which can be heated, *per hour*—at three different levels of water temperature rise—by coal fired boilers having round grates of from 8″ to 24″ in diameter.

All capacity figures reflect a 50% thermal efficiency of the water heater or boiler and show not only the maximum obtainable *hourly* recovery capacity—based upon the accepted fact that not more than six pounds of bituminous coal can be efficiently burned per hour/per square foot of grate area with half-hour firing periods—but also the hourly recovery capacity which will be obtainable if the coal burning rate is lower due to improper or less frequent firing.

To determine the recovery, or water heating capacity—in gallons of water raised a *given* number of degrees, F., in temperature in *one hour*—of coal fired water heaters or water heating boilers having square or rectangular fire-pots and grates use the following capacity table as directed.

For each square foot of grate area the recovery (heating capacity)—in gallons of hot water per hour at various, *given,* temperature rises—will be approximately:

54	**Gallons**	**of**	**Water**	**Raised**	**100° F.**
45	"	"	"	"	**120° F.**
39	"	"	"	"	**140° F.**

The above capacity figures also reflect a thermal efficiency of the water heater or water heating boiler of 60% and are based upon burning six pounds of bituminous coal per hour per square foot of grate area.

**See February issue of Amer. Gas Journal page 25.*

Adding Recovery Capacity

Hot water demand characteristic, including peak period demand, duration of peak demand periods and frequency of peak demand periods are factors which influence the determination of the relative advisability or necessity for increasing the recovery capacity or hot water storage capacity of recovery water heating systems.

For installation directions covering the increase of recovery and/or storage capacity of water heating systems refer to Chapter IV, which will follow.

Schematic diagrams showing methods of increasing the recovery capacity of various types of recovery water heating systems will be shown.

BOOSTER WATER HEATERS

General. A Booster Water Heater is one which functions to *raise* the temperature of *already heated* water to a *higher,* desired temperature where required for a specific purpose.

Where the demand for hot water at a temperature considerably in excess of normal requirements represents only a relatively small portion of the total hot water demand, it is desirable and advisable to maintain the temperature of the recovery water heating system at a lower level adequate to satisfy the requirements of regular usage and to employ a Booster Water Heater to raise the temperature of the hot water from the recovery system to the higher level which may be required for a specific purpose. The inescapable waste of hot water incidental to the tempering of excessively high temperatured water to a lower, usable, temperature would be eliminated as would be the hazard of possible personal injury attendant upon the use of hot water at or near scalding temperature. The over-all efficiency of the system would be improved and the accelerated rate of deposition of lime or other scale in the water carrying parts would be localized in the booster heater and the piping which carries the super heated water to the point of use.

The desirability of avoiding the inescapable heat loss incidental to maintaining a stored reserve of hot water at excessive temperature to meet an intermittent demand which, in the course of a 24 hour period, will represent only a relatively small portion of the *total* hot water demand indicated the advisability of employing a booster water heater to supply such a demand.

The most common example of the use of booster water heaters is their employment to raise the temperature of the hot water from a Recovery Type water heating system (usually 130° to 140°, F.) to a temperature of from 180° to 190°, F., to supply the final, rinse water requirements of spray type dishwashing machines. Also operating to raise the temperature of already heated water to a higher temperature *only* as it is used, i.e., as it flows through the heater; a booster water heater functions essentially as an instantaneous heater. Under such operating conditions the heat required must be instantaneously available.

Due to this requirement the heating medium must be either gas fuel or steam.

Since the water is heated only as used, the recovery capacity of a booster water heater should be visualized in terms of the number of gallons *per minute,* at a *given* water temperature rise, which it can supply or the *rate of flow*—in *gallons per minute* of boosted water—which it can maintain. The capacity is definitely limited by the *rate* at which fuel can be burned or heat applied in the heater.

For example—Where a Booster Water Heater will be called upon to supply the final, 180° rinse water requirements of a spray type dish-

washer it *must* be capable of supplying the 180° water at a *rate of flow of five gallons per minute*, although it may be necessary to supply this hot water during only 60, twenty-second rinse perods in a single hour in which the *total demand* for 180° water would be only 100 gallons. Under such conditions the booster heater *must* have a rated water heating capacity of at least 300 gallons *per hour* at a 60°, F., water temperature rise as a possible, periodic drop of 20°, or more in the temperature of the already heated water supplied to the heater should be anticipated. It will accordingly be apparent that, were the booster water heater for the above job to be selected on the basis of *hourly demand*—100 gallons per hour—it would be capable of supplying the 180° water at a rate of flow of only one and two thirds gallons *per minute* which would be *totally* inadequate or would result in the temperature dropping below the required 180° if the water were supplied at the desired rate of flow of five gallons *per minute*.

GAS FIRED BOOSTER WATER HEATERS

General. The necessity for a booster water heater being capable of supplying high temperatured water—particularly when meeting the demand for final rinse water in a spray type dishwasher,—within close temperature limits and the necessity for maintaining the required water temperature within close limits at a specified minimum rate of flow indicates the need for restricting the use of Gas-Fired Water Heaters for this service to heaters of the Instantaneous Type having a rated, gas-input capacity adequate to raise the required flow of water to the desired temperature.

GAS FIRED, INSTANTANEOUS WATER HEATERS AS BOOSTERS

The conventional type of Gas-Fired, instantaneous water heater may be employed as a booster water heater as the temperature of the hot water discharged from the heater is *Thermostatically* controlled within sufficiently close limits to satisfy ordinary requirements where an occasional surge of hot water at a temperature above the required minimum may not be objectionable. Operation of this type of heater in booster service may, however, be unsuccessful if the construction of the primary control is such that the introduction of already heated water instead of cold water into the heater would cause unequal expansion of the cylinder and/or piston or other parts which might result in freezing or binding of these moving parts or by-passing of the water around the piston and plunger.

In either event the responsiveness of these parts to the differential in water pressure, resulting from the opening of an outlet in the hot water discharge line, would be materially impaired and effective control of the gas supply and of the discharge water temperature would be difficult to maintain.

In heaters of this type, the heat of the gas flame is transmitted to the water flowing through the copper tubing coil by direct conduction. When water flow through the coil *ceases*, the main burner gas flame is immediately extinguished.

CONTROL OF WATER TEMPERATURE

Control of water temperature is identical to that described for instantaneous water heaters.

Attention is invited to the fact that *low water pressure will interfere* with proper operation of this type of water heater. If the static pressure of the water supply system should *drop* to approximately 15 pounds, or less, the force exerted by the differential in water pressure occurring in the cylinder of the primary control or water motor would be inadequate to overcome the frictional resistance to the movement of the piston plus the frictional resistance to the movement of the Gas Valve Stem actuated by the water motor. As a result the water motor and its companion Gas Valve would be abnormally slow or fail to function and prevent the hot water being delivered at the minimum required temperature.

In such an event, however, the supplementary, thermostatic control should function as a safety control to ultimately *shut-off* the gas to the main burner if the primary control or water motor should fail in the "Open" position.

The pilot gas supply is taken off ahead of the Gas Valve in the primary control unit or water motor.

Capacity. The recovery capacity of a conventional, gas-fired, instantaneous water heater operating as a booster has been set forth in Chapter 1.

For example: Temperature Rises in this case will be approximately:

0.24	Gallon	of	Water	Raised	60° F.
0.28	"	"	"	"	50° F.
0.35	"	"	"	"	40° F.

The above figures reflect a thermal efficiency of the heater of 70% necessary to obtain A.G.A. approval. Consideration must also be given to the fact that, as the initial temperature of the inlet water *increases*, its ability to absorb additional heat, or the *rate* of heat absorption, *decreases*. Since the figures shown in the above capacity table are predicated upon the heater operating to raise the water from normal, average, ground water temperature to a higher temperature, it will be apparent that, when the heater operates as a booster to raise already heated water to a higher temperature, the recovery capacity or water heating rate will be somewhat *less* than the capacities shown in the table. For this reason, a safety factor of approximately 20% should be allowed when estimating the recovery capacity which will be required to adequately supply a specific hot water demand.

FINNED HEAT EXCHANGER, GAS FIRED, WATER HEATERS AS BOOSTERS

As this type of water heater is equipped with a thermostatic control unit which not only *turns on and shuts-off* the gas supply to the main burner upon the *starting or shutting off* of water flow through the heater but *also modulates the rate* at which gas is supplied to the burner to accomodate the volume of heat to fluctuations in load resulting from increased or decreased rate of flow of water and variations in inlet water temperature, it is well adapted to functioning as a booster water heater.

The heat of the gas flame is transmitted to the water flowing through the copper-finned heating element by convection, i. e., there is no direct impingement of the gas flame upon any of the surfaces of the heating element.

Due to the relatively high ratio of heat transfer area of the extended surface, copper-finned heat exchanger, to the water content, both the rate of heat absorption and heat absorption capacity exceed that of a heating coil having only prime surface. Heat loss by radiation from the internal surfaces of this type of heater during off-peak periods when the heater is not operating is materially reduced as result of the extremely low water content of the heating element and other water carrying parts.

CONTROL OF WATER TEMPERATURE

Control of the temperature of the hot water discharged from a heater of this type is accomplished by means

of a thermostatic control unit installed in the heater and also a thermostatic pilot control of the safety type which serves to lock the main gas valve in the unit in a *closed* position in event of pilot failure or pilot flame extinguishment.

This thermostatic water temperature control which, unlike others, operates on the differential between inlet and discharge water temperatures to maintain the required discharge water temperature within very close limits, not only serves to *open and close* the main gas valve in the thermostat upon starting or stopping of water flow through the heater but *also to modulate* the gas supply to the burner so that gas is continuously supplied in direct proportion to the load, i.e., the rate and/or volume of water flow through the heater *and* the number of degrees which the water must be raised in temperature.

The thermal element of the thermostat, which is of the bi-metallic type, is immersed in the flowing water in a water way in the heater. Expansion in the temperature of the flowing water to a selected, pre-determined degree—serves, through mechanical linkage, to *shut-off or restrict* the flow of gas to the main burner as may be required.

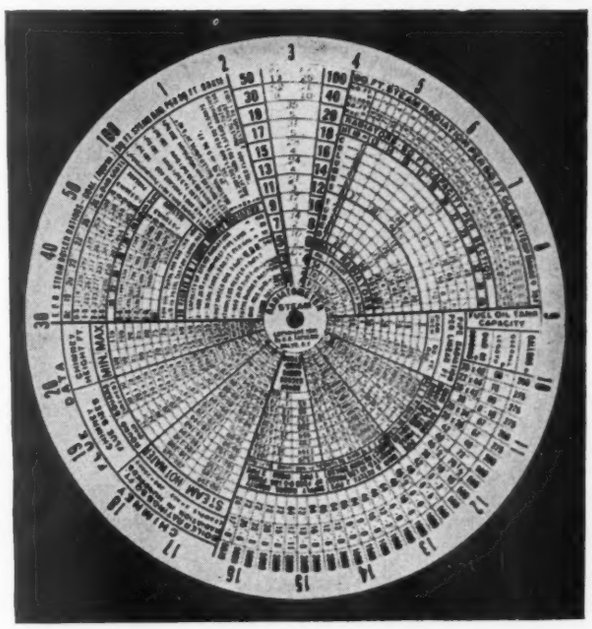
Upon a *drop* in temperature of the water flowing through the heater the resultant constriction of the thermal element serves to *open* the gas valve in the thermostat to the extent necessary to supply gas to the main burner at the rate required to heat the water flow to the desired, pre-determined temperature.

A safety, gas shut-off is also supplied for installation in the gas supply line at a point close to the water inlet of the heater within a relatively short distance of the heating element where the greatest heat concentration would occur in the event of failure of the thermostatic control unit to shut-off or modulate the flow of gas to the main burner when required. In the event of failure of the thermostatic control unit to function properly, or if over-set, the excessive heat generated would be quickly communicated to the bulb of the safety gas shut-off valve where the fusing or softening of a metallic alloy contained in the bulb would permit this valve to *close,* shutting off all gas including the supply to the pilot burner. The closed, safty shut-off valve may be manually re-set after permitting the heater to cool—correcting the trouble which resulted in over heating—and re-lighting the pilot.

(Concluded on page 62)

Quick, Accurate Answers for Heating and Water Heating Jobs solved by the

Heat-O-meter



Direct readings appear on the Heat-O-meter, covering factors entering into all heating calculations.

The Heat-O-meter employs three concentric celluloid printed discs. Outside disc, 6¼" diameter, is printed in red on both sides. The inner discs are printed in black with a cut-out V sector.

It covers sizes of mains, returns, risers, radiator sizes and capacities, round and sectional boiler net ratings, chimney flue sizes, capacities and heights. Also hot water and fuel tank sizes and capacities, hot water generator capacities, etc.

A real necessity and time saver for

Heating Engineers and Salesmen
Architects and Builders
Heating Contractors
Plumbers and Steam Fitters

The Heat-O-meter gives instant reply to all questions without laborious calculations. Used by many leading Heating Engineers. Price $5 each, postpaid.

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53 Park Place, New York 7, N. Y.

Please enter our order for.....Heat-O-Meter at advertised price of $5. each.

☐ Remittance herewith ☐ Send C.O.D. ☐ Send bill.

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Pennsylvania Gas Association Sales Conference

THE Pennsylvania Gas Association held its mid-year sales conference in Philadelphia, February 1st. It was one of the most successful conferences ever held by the association, the attendance being about 400.

The meeting was opened by R. W. Uhler, chairman, New Business Committee, and after an address of welcome by Frank H. Trembly, Jr., vice-president, the Philadelphia Gas Works, the meeting was turned over to the chairman, G. L. Cullen, of the Harrisburg Gas Co.

The Servel-Designed New Freedom Gas Kitchen was displayed and demonstrated under the direction of R. J. Canniff, sales promotion manager for Servel.

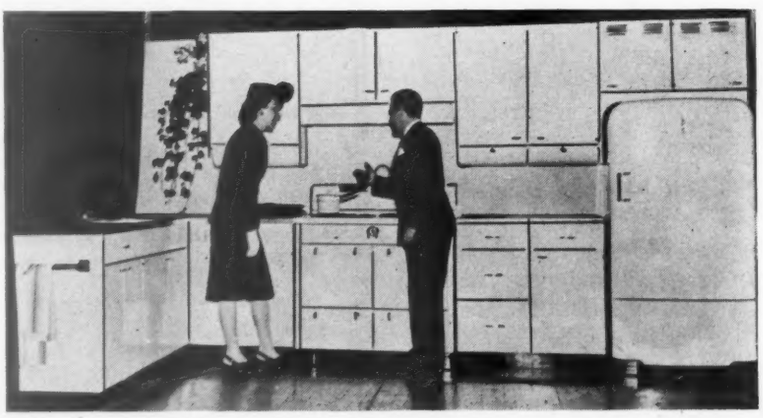
"There are three excellent reasons," Mr. Canniff said, "for the Servel-Designed New Freedom Gas Kitchen. They are (1) to develop a line that would be exclusively gas with merchandisable features, (2) to present a united front in the 'battle of the fuels' through cooperation with all manufacturers of 'CP' ranges, and (3) and perhaps the most important reason, from the customer's point of view, is to furnish that customer with a single source of supply for her entire kitchen."

In introducing the Servel-Designed New Freedom Gas Kitchen which was on display at the meeting, Mr. Canniff emphasized that, as in time past, Servel would continue the selling philosophy of exclusive points of difference. In the designs thus far produced, the Servel line offers three separate units to supplement basic appliances and make the kitchen an easier and more comfortable place in which to work. Three exclusive features shown were the air control, dry storage, and finger tip cabinets. Mounted immediately over the open burners of the range, the air control cabinet removes greasy vapors, odors, and excess heat, and provides new freedom in the postwar kitchen. This air control cabinet was devised in the engineering laboratories at Servel and provides instant air control at the source of heat, odors, and vapors. The second feature demonstrated is a dry storage cabinet which is mounted immediately over the Servel refrigerator. This cabinet provides humidity-free storage space for foods requiring a dry atmosphere such as crackers, cookies, salt and cereals. In the demonstration it was pointed out that the new dry storage cabinet, operating in conjunction with the refrigerator, centralizes food storage and renders a new type of food preservation service in that dry foods stay fresh and crisp for extended periods.

After the demonstration of the new line, Servel's Four Area Plan of merchandising kitchens was explained. "This new merchandising plan," Mr. Canniff pointed out, "is adaptable for both large and small utilities and suggests all the merchandising phases necessary for successful promotion." In explaining the plan, Mr. Canniff divided the complete sale into four areas, the first of which was advertising and promotion. This area includes anything that is done to create a prospect, whether it be newspaper advertising, direct mail, car cards, or personal contact, a function which is well understood by gas utility companies and can be administered by present staffs.

As explained at the meeting by Miss Gay Seaton, director of Kitchen Planning for Servel, the consultant's work breaks down into five very definite steps. The first of these is screening of interest in which "suspects" are divided from "prospects." The second step is in gathering information from which the kitchen consultant can aid the prospect in planning her own kitchen to meet the needs of family living. The third step is in arranging the kitchen with proper coordination of work centers to provide the greatest convenience and efficiency possible in that kitchen. In steps two and three the customer is included as an active partner in

1:—Using a floor plan of the customer's kitchen, small scale models of the kitchen units can be placed and shifted at will until the complete ensemble is assembled in miniature to customer's desire.



2:—Each unit of the New Freedom Kitchen is explained in detail and its convenience of location with respect to other units is dwelt upon.

planning, and under the guidance of a trained consultant, she plans her own kitchen to best suit the needs of her own individual family. The fourth step after arrangement is personalizing the kitchen, which Miss Seaton called "putting the frosting on the cake." It involves such things as selecting the color scheme, materials and colors for floor covering, work tops, curtains, and even pottery.

In closing his presentation of Servel's new kitchen program, Mr. Canniff pointed out that labor unrest and material shortages made it impossible to exactly predict deliveries of completed kitchens to the gas industry.

"I want to emphasize at this time," Mr. Canniff concluded, "that the Servel-Designed New Freedom Gas Kitchen and the Kitchen Planning Center, which we are showing, while engineering models, are representative of a completely designed program of manufacturing and merchandising which will be made available to the gas industry to help score a complete victory in the days of stiff competition which lie ahead."

"What's Cooking in CP Gas Ranges," was the subject of a talk by Sol Weill, Geo. D. Roper Corp., who used charts to show the progress in gas cooking.

At luncheon, H. Carl Wolf, managing director of the American Gas Association, reviewed some of the activities of the Association with special reference to the research and promotion programs.

G. M. Jones, Consumers Gas Co., was chairman of the afternoon session.

Robin A. Bill, Surface Combustion Co., spoke on the subject "Looking Ahead with Gas House Heating," G. M. Rohde, Jr., Ruud Manufacturing Co., talked on "Selling the Difference," and W. A. Friedrich, Hamilton Mfg. Co., "The Sixth Load Builder."

All the speakers have had wide experience in their respective fields, and presented worth while ideas to the delegates.

Bryant Develops New Gum Filter

The development of a vapor-phase gum filter is announced by the Bryant Heater Company, Cleveland.

Available for application to stoves, water heaters, boilers, and other domestic gas heating equipment in manufactured gas areas where gum must be removed from the line, this filter is efficient but mechanically simple, and hence very economical. Only five parts are used in the clean-cut filter assembly, which has the approval of the American Gas Association.

More than just an exciting new feature. One of the most important basic improvements in gas range design in years. And only Estate Heatrola Ranges have it.

SEPARATE MEAT OVEN (BAR-B-KEWER*) BROILS WHOLE ROASTS
... leaves oven free for baking cakes, pies, biscuits, casserole dishes
Cook roasts, hams, chickens, turkeys, here...
While you bake cakes, pies, biscuits, here!
BAR-B-KEWER

Ends last-minute mealtime hurry-flurry. For the largest rib roasts, legs of lamb, even whole hams and turkeys never ask for an inch of precious oven space in the new Estate Heatrola Gas Ranges. They have their own separate meat oven — the Bar-B-Kewer — freeing the regular oven for baking pies, cakes, biscuits at the same time, without crowding or temperature juggling. Millions of women are reading about it in the national magazines. They'll be looking for it in your display room.

ESTATE *Heatrola* RANGES

Made by THE ESTATE STOVE COMPANY, Hamilton, Ohio
First with the finest for over 100 years

**Reg. U.S. Patent Office*

First Annual Convention of I.N.G.A.A.

THE Independent Natural Gas Association of America, held its first Annual Convention January 28th, at Houston, Texas. It re-elected all of its officers and six new directors to serve during 1946.

The officers are: E. Buddrus of Chicago, president of the Panhandle Eastern Pipeline Company, president; Paul Kayser of Houston, president of the El Paso Natural Gas Company, first vice president; J. H. Dunn of Amarillo, president of the Shamrock Oil and Gas Corporation, second vice president; F. W. Peters of Tulsa, treasurer of the Oklahoma Natural Gas Company, treasurer, and John A. Ferguson of Washington, D. C., executive director.

The new members of the Board of Directors are: H. W. Bass of Dallas, president of the Trinity Gas Corporation; Frank Buttram of Oklahoma City, president of the Buttram Petroleum Corporation; B. A. Hardy of Shreveport, La., independent operator; D. A. Hulcy of Dallas, president of the Lone Star Gas Company; F. S. Kelly, Jr., of Shreveport, Arkansas-Louisiana Gas Company; and Homer W. Long of Guymon, Oklahoma, independent operator.

The other Board members are: Mark Adams of Wichita, Kans., treasurer of the Stevens Oil and Gas Company; Clyde H. Alexander of Corsicana, Tex., independent operator; Burt R. Bay of Omaha, Nebr., president of the Northern Natural Gas Company; Joseph Bowes of Tulsa, president of the Oklahoma Natural Gas Company; Mr. Buddrus; Mr. Dunn; LeRoy M. Edwards of Los Angeles, Calif., vice president of the Pacific Lighting Corporation; A. B. Harper of Fort Smith, Ark., Arkansas-Oklahoma Gas Company; D. D. Harrington of Amarillo, Hagy, Harrington and Marsh, producers; E. C. Joullian of Oklahoma City, president of the Consolidated Gas Utilities Corporation; Mr. Kayser; Harry L. Mann of Memphis, Tenn., president of the Memphis Natural Gas Company; W. G. Skelly of Tulsa, president of the Skelly Oil Company; William H. Wildes of Dallas, president of the Republic Natural Gas Company, and C. H. Zachry of Dallas, president of the Southern Union Gas Company.

John A. Ferguson
Executive Director

Declaration of Principles

The natural gas industry by individual initiative and effort under our traditional system of free, competitive, private enterprise has earned a major position in the domestic economy of America.

Supplying forty million users with a clean, efficient, economic fuel, it pays bonuses, rentals and royalties to hundreds of thousands of land and royalty owners, provides gainful employment to many thousands of employees, and contributes substantially to local, state and federal revenues.

Meeting ever-increasing demands and uses with continually improving techniques and new discoveries until reserves have now reach an all-time high, the natural gas industry is at the threshold of an era of expansion and service.

To promote the welfare and advance the progress of the industry in order that it may improve and expand its service to the ultimate public benefit, the Independent Natural Gas Association of America pledges its support to achieve through all proper and appropriate means, the following fundamental objectives:

1. Preserve the time-tested, democratic principles of private ownership, individual initiative and competitive enterprise free from government competition or proprietorship in any form.

2. Promote scientific research to continue improvements in the exploration, production, conservation, transportation and utilization of natural gas.

3. Provide more adequate markets for independent producers and royalty owners, maintain discovery rates, further conservation, and make natural gas more widely available for public use by necessary expansion of pipe lines.

4. Maintain as the exclusive function of the producing States the regulation of the production, gathering and conservation of natural gas and support the enactment and adminis-

Above are three of the officers chosen by the Independent Natural Gas Association of America at the INGAA annual meeting held January 28 to serve during 1946. They are: (left to right) F. W. Peters, of Tulsa, Okla., treasurer of the Oklahoma Natural Gas Company, treasurer; E. Buddrus of Chicago, Ill., president of the Panhandle Eastern Pipeline Company, president, and J. H. Dunn of Amarillo, Tex., president of the Shamrock Oil & Gas Corporation, second vice president. Paul Kayser of Houston, Tex., president of the El Paso Natural Gas Company, was chosen first vice president. All were re-elected, having served in the same positions during 1945.

tration of sound waste prevention measures by the States to assure orderly development, to require ratable taking on an equitable basis, to preserve correlative rights and prevent improper withdrawals, to establish proper gas/oil ratios, to encourage cycling and repressuring wherever warranted, and to provide markets for reasonably accessible oil solution gas.

5. Limit the jurisdiction of federal agencies to the reasonable regulation of the interstate transportation of natural gas and its sale in interstate commerce for resale, specifically excluding such agencies from any regulation whatsoever of production, gathering, processing, compressing or fixing the price of natural gas prior to its entry into interstate commerce for resale.

6. Safeguard the benefits of free competition among fuels, allow the sale of natural gas competitively with coal and other fuels for industrial use, and prohibit any regulation of the regional and functional end use of natural gas either directly or indirectly by any federal agency.

7. Retain the option of expensing intangible drilling costs and the percentage depletion allowance provisions of the income tax laws to prevent disruption of stabilized industry economy. Remove the threat of double taxation, as separate business entities, to voluntary unitization operations desirable for the efficient conservation of natural gas.

The following resolution was also adopted:

WHEREAS, in recent years proven natural gas reserves have become greater than the proven oil reserves, and

WHEREAS, the increased importance of natural gas to the nation has raised many problems of conservation, production, transportation, and utilization, whose proper solution affects the national economy, defense, and general welfare, and

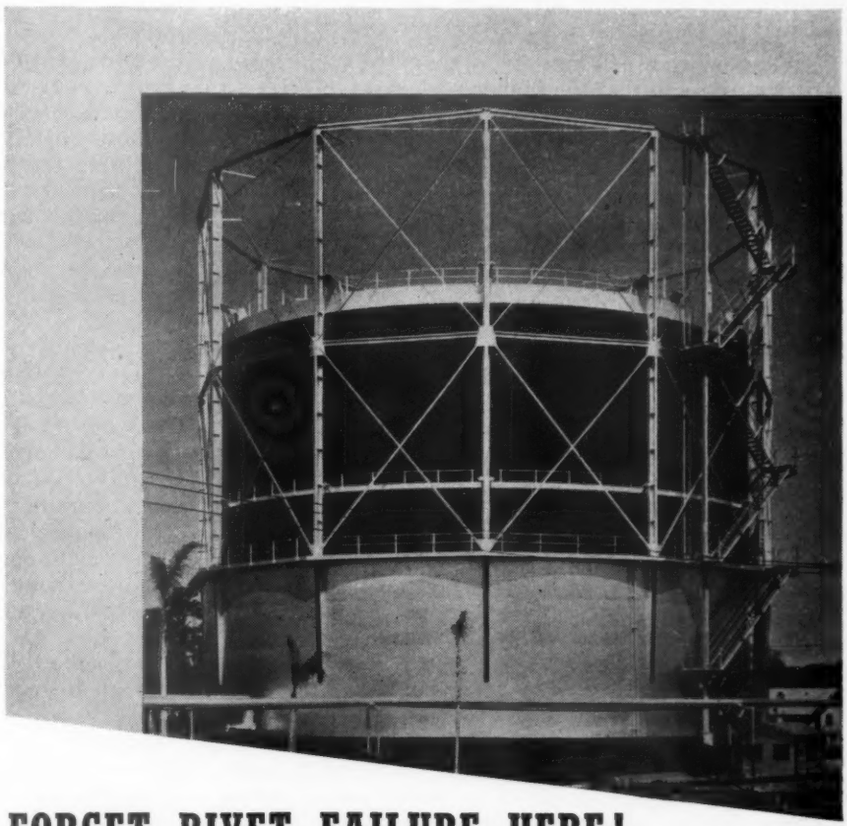
WHEREAS, in solving these problems there is a great need for additional fundamental engineering research such as that so ably conducted in the past by the U. S. Bureau of Mines, and

WHEREAS, immediate expanded research on natural gas offers one of the greatest opportunities for the enhancement of our natural resources and for increasing the national wealth, and

WHEREAS, the purposes of the Independent Natural Gas Association of America are, in part, "to promote and advance the welfare, progress, and development of the natural gas industry in the United States of America" and "to cooperate with officials of governmental agencies in any program considered essential to national welfare" and

NOW, THEREFORE, BE IT RESOLVED, that the Independent Natural Gas Association of America requests the Bureau of Mines to plan and carry out a greatly enlarged and progressive research program on natural gas necessary to keep pace with the rapidly growing national importance of this natural resource; and recommend to the Congress that sufficient funds be appropriated for that purpose.

Mr. Orr, secretary, revealed that the Association, which had set as its goal 1000 members before the convening of the first annual meeting, has surpassed that mark, having a present membership of 1280, classified as follows: 892 royalty owners, 120 producers, 41 transporters, 174 employee members and 53 associate members. The membership is represented in 31 states, with the four major producing states in the Southwest and California leading. Even the ladies of the industry are represented, he said, by 80 members. This indicates the growth of the Association since July 24, 1944, when its first office was opened.



FORGET RIVET FAILURE HERE!

There *aren't* any rivets to fail in this Stacey Brothers All-Welded Panel Type Gas Holder.

That's one important advantage of this type of construction, a Stacey Brothers feature. There are others, too—greater strength, more efficient operation, less maintenance expense.

It's reasons like these that have influenced the choice of Stacey Brothers for tanks. The installation pictured is typical—a 500,000 cu. ft. All-Welded Panel Design Wet Seal Holder.

Our experience includes more than three hundred distinct types of tanks—any practical size or shape—with gas holders ranging in capacities from 100 cu. ft. up to 10,000,000. We fabricate as light as No. 16 gauge sheet metal, and up to three inches thick.

Whether your needs are standard—or unusual—there's a Stacey Brothers Holder, *custom built* to fit your requirements. No problem is too tough for us—or too routine. We'll take *complete* responsibility for design, manufacture and erection. That way you save both time and money. We make it our business to deliver dependable, economical holder capacity. May we submit our quotation and recommendations, based on your own specifications and drawings?

STACEY BROTHERS GAS CONSTRUCTION CO.

One of the Dresser Industries

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Stacey Brothers TANKS

Abstracted Articles of Current Interest to the Industry

Carbonization

Modern Methods of Carbonization.
Gas Journal (British) J. W. Gibson December 19, 1945

The author confined himself to complete gasification, as he had in mind that the higher coal soars in price, in relation to the labor and operating costs, the more necessary it will be to obtain higher yields per ton of coal. The design of single-stage gas-making plant which will fulfill all the exacting requirements of the Gas Industry is not without considerable difficulties. The average calorific value of the gas required today necessitates the study of many processes, so that in one machine and in one automatic operation, gas of a calorific value equal to the average declared value is manufactured direct from coal, steam, and tar. By the direct application of heat, the flue space of a vertical retort installation and the space occupied by the retort walls are avoided, and as their upkeep forms one of the main items in the repair bill, their elimination wipes out this item. This is a salient factor in the comparative methods, which clearly indicates that the cost of repairs to a single-stage machine must necessarily be but a small fraction of that for the ordinary retort plant.

A comparison between single- and double-stage processes is interesting:

1. Capital outlay per therm produced, if the comparison is extended to include the building, is favorable to the one-stage process.
2. Ground space. The single-stage process occupies much less ground space.
3. Labor. With the Burns-Gibson type of plant automatically operated by temperature control, labor, other than the cleaning of the fires, is practically eliminated.
4. Handling Materials. The cost of handling materials is progressively rising. The relative weight of solid material handled per therm is in the neighborhood of over 1,000 tons for the two-stage process compared with under four hundred tons for the single-stage process.
5. Relative Prices of Coal and Coke. It frequently occurs that coke is of greater value per ton than coal, and when this is so, the saving in the manufacture of gas direct from coal is two-fold. First, there is the difference in value mentioned above, and secondly to this is to be added the additional therms of gas obtained from one ton of coal than from one ton of coke.

Technical Developments.
Gas World (British) December 1, 1945

Much has been done in the past towards improving the quality of furnace coke. The research work of the coking industry has been concentrated upon that problem, not perhaps, entirely but at least at a 90 per cent concentration. The coke committees main work is in that direction. It is observed rather ruefully "the spate of new tests being discovered by consumers for expressing degree of quality of coke," and suggests thereby that a good deal of this work is uncoordinated and springs from individual predilections. If that is so, warning should be taken of the condition of the coal industry in which every consumer requires coal of a different size so that ultimately the cost of supplying unnecessary sizes has gone beyond endurance. Cannot the coking industry decide which tests it will accept?

Chemical utilization is costly in plant and demands a high standard of production technique. It is therefore only to be engaged upon as a major development, and cannot be used as a means of gas utilization when the normal demand for gas for town or steel works purposes falls off. The recovery of ethylene seems likely to become established throughout the coking industry.

This, it is suggested, is a matter upon which the coking industry might approach the Government for backing. It would not be impossible for a gas grid to supply gas over a wide area and to supply as one major customer a factory owned by the industry with Government backing for chemical developments. The American chemical industry and the American petroleum industry have shown that products of value can be manufactured from refinery gases; far more than has yet been done could be accomplished from the gases derived from coal carbonization and from water gas derived from coke. The difficulty is that no one seems big enough to tackle this project in addition to what they have already on their slates. It appears that this is a matter for Government action, particularly if the Government is to take over the carbonization industries. But someone must take the initiative in putting this before the Government, because Governments have not the technical knowledge to think of these things for themselves.

Total Gasification

Total Gasification Systems Operated With Oxygen Blast.
Gas Abstracts (Institute of Gas Technology) Nov. 1945
J. J. Sebastian

Impressive progress has been made in the achievement of continuous and complete gasification of cheap low-grade fuels by the addition of oxygen to the steam introduced into the gasification chamber. The oxygen is continuously blasted together with steam into the generator at such a rate that the heat of combustion liberated is sufficient to supply the heat required for the endothermic decomposition of steam and to keep the fuel bed at the proper temperature. The improved Linde-Frankel process assured the production of oxygen at a favorable price. Three processes which have been introduced into large scale practice are described from

the viewpoint of design and operation of the plants. The Winkler process, developed by the I. G. Farbenindustrie, gasifies coke-breeze or low-grade, slack coals, ranging in size from ¼ in. to 65 mesh, which are kept in a highly turbulent motion by the introduced steam and oxygen or air. The gases made at temperatures varying from 1500-1750°F. range in heating values from 130 to 330 Btu per cu. ft. (after purification). The largest Winkler generator, 70 ft. high and 18 ft. in diameter, produces nearly 3 million cu. ft. of gas per hour, or about 13,500 cu. ft. per sq. ft. grate area per hour. For a gas of 330 Btu heating value (after purification) about 270 cu. ft. of 98% oxygen is used per 1000 cu. ft. of gas produced. The Lurgi process operated under pressure of 10-30 atm. with a fixed fuel bed, using non-caking fuels, such as brown coals, sub-bituminous coal, etc., ranging in size from 1" to 3/32". The highest temperature in the fuel bed is about 1500°F., and the heating value of the purified gas made ranges from 420 to 475 Btu, depending upon the fuel used. Large units with 8 ft. internal diameter produce 115-145 thousand cu. ft. of gas per hour, or about 2,500 cu. ft. per sq. ft. cross sectional area per hour. The oxygen used is about 60% of that needed at atmospheric pressure. Difficulties due to the intense heat developed at the point of introduction of the oxygen into the generator were overcome in the Thyssen-Galocsy process. The generator used is essentially a slagging oxygen and steam blown gas producer, employing a fixed fuel bed at a temperature of about 2000°F. The clinker melts and is extracted in fluid form. The size of the generator in one plant is about 8.5 ft. in diameter, producing 830 thousand cu. ft. of gas per hour, ranging in heating value from 300 to 340 Btu.

By Products

Some Future Products From the Synthesis of Petroleum and Natural Gas.
Mining & Metallurgy Nov. 1945

New products of the chemical industry for which the petroleum and natural gas industry will be called upon to supply much of the raw material include synthetic resins or plastics synthetic textiles and chemicals for textile treatment, bonding adhesives, wood-treating chemicals, and the silicones. These are likely to be mass-production industries, requiring sizable quantities of the products of our oil and gas wells, they will enter into our food, clothing, shelter, and transportation, four fundamentals of modern civilization.

Process Trends

Trends In Process Equipment Development.
Chemical Industries Nov. 1945

Recent plant equipment applications disclose three important trends:

(a) Old specialized operations are being reduced to the status of unit operations.

(b) Increased use is being made of equipment types which combine several functional operations into a single process step.

(c) Development of continuous processing has progressed at a rapid rate aided by more efficient equipment, greater mechanization, and better control instruments. Underlying these application trends are the many minor improvements which have enabled designers to produce better equipment:

(a) Developments in chemical engineering theory have improved the accuracy of designs and opened new avenues of approach.

(b) Continued introduction of new construction material has broadened the field of equipment design for special services.

(c) Many minor improvements in mechanical devices have extended range of equipment performance.

Research

Summary of Results and Conclusions on Research in High Speed Direct Air-Gas Heating of Metals.
AGA Committee of Industrial Gas Research

A. With heating rates as high as 2 to 4 minutes per inch of diameter or thickness, and with billet sizes up to 8 in. diameter for non-ferrous metals, and up to 5½ in. squares for ferrous metals, it was found that all metallurgical and physical effects observed were at least as satisfactory as corresponding effects obtained with slower furnace or electric induction heating methods.

B. It may be concluded from experimental results summarized in item A, and from results obtained with production industrial heating installations on literally tens of thousands of gears, crankshafts, sprockets, shot, tank caterpillar links, and numerous other products fabricated for war purposes by high speed gas combustion methods, that no deleterious effect of accelerated heating rates on the metallurgical or physical properties of metals will be encountered.

C. Experimental data reveal that certain advantages may be derived by application of high speed gas combustion heating methods, inasmuch as results disclosed that there was less tendency to scaling, decarburization, grain growth and distortion and at the same time more gradual and fracture-resistant zones of transition from treated or untreated areas (as in surface hardening). It was also observed that there existed greater independence of control of time temperature cycles in different parts of the same piece.

D. With accelerated heating at high temperatures, metallurgical structures were obtained which were identical to those resulting from longer heating times at lower temperatures. For example, copper extrusion slugs heated for 90 seconds in a 2100°F. high-speed gas combustion heating unit were identical metallurgically, physically, and in surface brightness, to similar slugs maintained for 51 minutes in an electric atmosphere furnace at 1550°F.

E. For the size of billets included in this investigation, it was found that the equalization of surface and center temperatures of metals heated at high rates occurred in such time as to make holding cycles unnecessary; that is, the time consumed in normally transferring parts of the sizes investigated from heating station to any subsequent working station (for quenching, forging, rolling, pressing, etc.) is generally adequate for suitable temperature equalization. Where heavier work is to be treated to hardening temperatures since the thermal properties of steel limit the depth at which hardness can be obtained regardless of the temperature uniformity in the piece.

F. Data indicate that high-speed gas combustion heating methods can be applied with lower initial and lower operating costs than either induction or oxyacetylene methods. When all costs such as plant space, labor, tooling-up time, percentage rejections, and other factors, as well as equipment and fuel costs, are properly evaluated high speed gas combustion heating methods frequently result in lower total production costs than can be realized with conventional furnace heating methods.

KNOCKS THE H_2S OUT OF GAS

It's a big claim, but we can make it because Lavino has been doing that kind of a job in hundreds of gas plants for years.

Lavino Activated Oxide is approximately 78% ferric oxide, an important factor. But . . . a high ferric oxide content alone won't do a thorough job of removing H_2S. The ferric oxide must possess maximum activity and capacity for trace removal, evenly distributed on a carrier carefully chosen for hardness and toughness, that will not pack or crush during handling or use; chemically treated to prevent fungus growth or mold. That way you get an even controllable flow of gas through a purifying agent that literally knocks the H_2S out of gas . . .

Supplied in unmixed or sponge forms.

LAVINO ACTIVATED OXIDE

MAXIMUM H_2S REMOVAL PER LB. OF OXIDE

E. J. LAVINO and Company

1528 WALNUT ST., PHILA. 2, PA.

G. Contemporary high speed gas heating equipment not only produces satisfactory metallurgical and physical properties in metals being heated, but also provides heating rates effectively competitive with electric induction or oxyacetylene methods. In addition, such equipment seems ideally adaptable to continuous straight-line production methods, for the incorporation of the heating equipment in "machine-tool" type equipment, and for effective utilization of unskilled operating labor.

H. It may be concluded that the high heating rates reported here do not represent the ultimate which can be obtained with gas combustion methods.

Combustion

Flow States In Burner Streams.
Gas Times (British) Dec. 8, 1945

This paper embodies an account of a preliminary investigation into the flow states of gaseous streams; it forms a continuation of the work described in the Institution Gas Research Fellowship Report, 1942-43. A main purpose of the investigation is a more complete understanding of the mechanism of blow-off of burner flames. It has already been established that aero-dynamical factors appear to have no influence in conditioning the dead space between the base of the flame and the head of the burner, an important factor in controlling the light back of aerated burner flames; dead space is, without doubt, attributable to the thermal gradient ahead of the flame. It is now certain, however, that the phenomenon of blow-off involves other factors, including flow states and the nature of the diffusion of the inflammable medium concerned into the surrounding atmosphere. The technique of instantaneous shadow photography, which is particularly suited to such an investigation, is being applied in an attempt to relate the flow states in gas streams with flame stability and injector action, in order to assist burner design. The results so far obtained indicate that emergent gas streams behave in a characteristic manner, apparently following laws of flow similar to those governing the flow of confined fluids, and the transition from one type of flow to another appears to be related with the stability of an ignited stream. As yet the work has been confined to one type of orifice and to relatively low rates of flow; it will be extended to cover other factors involved, in order to arrive at a complete analysis of the problem.

District Heating

First Report of the District Heating Committee.
Gas Times (British) December 8, 1945

Having examined published and unpublished information relating to district heating schemes and made comparisons with alternative methods of heat distribution in the manner described in the body of the report, the district heating committee has come to the following conclusions:

1. That district heating is a practicable method of improving the utilization of fuel and has considerable merits as a method of smoke abolition and coal economy.

2. District heating combined with electricity supply is likely to be economically as well as technically satisfactory in districts where the density of low temperature heat demand is exceptionally high, but compares unfavorably with the use of gas or gas and coke in those areas of normal demand which represent the greater part of British towns.

3. The interest which has been aroused in many quarters by the discussion of district heating indicates an increased desire for improved methods of fuel supply, a state of affairs which provides the gas industry with an opportunity to extend its service in the satisfaction of this desire.

4. Seeing that the areas of exceptionally high density of heat demand are less numerous and less extensive than in some other countries, it would seem that the most favorable development of district heating would be on the lines of what has been called "zonal heating," which involves central heating systems for blocks of buildings covering an appreciable area and in sufficiently large units to justify the raising of steam under pressure and the expansion of this steam, with the production of electricity, before its use for the primary purpose of conveying heat.

Radiant Heating

First Report on Radiant Heating of Joint Research Committee.
Gas Times (British) Dec. 22, 1945

The work described in this Report was primarily directed towards a study of the mechanism of heating by radiation, with the particular objective of establishing whether the quality (i.e. the distribution of the radiant energy with respect to wave length) of the radiation used was of significance in industrial processes in general. This question is of especial importance to the gas industry, (a) because the radiation emitted by most gas heated sources is essentially of longer wave lengths than that from electric tungsten filament lamp units, the difference being largely due to the higher operating temperature of the latter, and (b) because in certain industrial processes, such as the drying of paints by radiant heating, claims have been made that the use of short wave radiation is advantageous.

The introduction (Section III) deals with the basic principles of the utilization of radiant energy for heating purposes and shows the fundamental differences between radiation and convection methods. The dependence of both quantity and quality of the radiation on the temperature and nature of the emitting source is considered, with special reference to materials which radiate selectively, i.e. whose emission, relative to that of a black body at the same temperature, varies at different wave lengths.

Section IV describes the infra-red spectrometer used in this work, and the technique of determining emission and absorption characteristics of various industrial materials.

Section V gives the results of a preliminary and general survey of the emission characteristics of typical refractory materials from which the radiating surfaces of high temperature gas heated units are usually made. It is shown that materials of this type are selective radiators, their emission over relatively short wave lengths being considerably less than from an ideal radiator (black body) at the same temperature. Some increase in short wave emission was obtained by adding small proportions of colored oxides of the parent materials, but the effects observed up to the present are relatively small and are probably of little practical importance in so far as the enchanced emission in the shorter wave lengths is concerned. In tests designed to stimulate practical conditions, however, comparative emission measurements were made when the thermal in-put was the same. In this case the total emission from the materials of low emissivity approached that of the black

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body, but the temperature attained was far higher. It appears that the total rate of emission of radiant energy from a gas heated unit employing heated refractory surfaces may not be less than if the surface had black body characteristics. The thermal efficiency of the unit may be lower, however, since the rate of effective heat transfer from the products of combustion to the radiating surface depends on the temperature of the latter. From this point of view, the emission properties of the refractory surface should approach those of a black body as nearly as possible, and it is mainly as a means to this end that additives may be of importance.

Section VI gives the results of a study of the transmission characteristics of representative stoving enamels. In general, the paints showed relatively little transmission at short wave lengths (e.g. those in which the bulk of the radiant energy from the tungsten filament lamp is situated); at higher wave lengths all the paints showed considerable transmission. Except in one or two cases, there was no evidence that short wave length radiation substantially penetrates the paint film; simultaneous penetration and absorption is the general rule. In most cases it appeared that the wave length of the incident radiation used is of little significance in the paint drying process. In special circumstances, however, this generalization may not apply: for example, when the paint film itself is appreciably reflecting, or when the metal surface on which the paint is applied is a substantial reflector of radiation and the paint or lacquer has high transmission characteristics.

Section VII deals generally with the mechanism of the radiant heating process, with particular reference to its limitations. As the majority of industrial materials are largely opaque to radiation, the incident energy is absorbed on or very near the surface, which thereby becomes rapidly heated. The rate at which the interior of the material is then heated depends upon its thermal characteristics.

When an opaque material is liable to spoil at relatively low temperatures, radiant heating then may offer little, if any, advantage over convection methods as regards speed. Certain important industrial materials (e.g. plastics) were found to transmit short wave radiation appreciably. The transmission data indicated that longer wave radiation was preferable for softening such materials by radiant heating, a conclusion which is in accord with practical experience.

Radiant Gas Burners in the Modern Oven.
Products Finishing Nov. 1944

This study of the utilization of radiant heat has been the end result of progress in several fields of industrial activity, one of which has been the rapid development of thermosetting finishes. Taken together, these developments have all contributed to each other's progress to the extent that there have been a major change in oven design and heat application that has been well nigh revolutionary.

During this evolution of oven design, many mistakes have occurred as a result of experiments, misunderstanding, and ignorance, but in spite of this, industry, today, is producing finished articles far more economically, in a much shorter period of time, in a vastly increased variety, and of a higher standard of quality than was considered possible a few short years ago.

In order to trace this development and to obtain a clear picture of the whole field, it is desirable to draw the distinction between the various kinds of finishes being used in industry as well as the various forms in which heat may be utilized.

There are three general classifications or types of finishes:

1. Oxidizing paints.
2. Lacquer finishes containing rapidly evaporating solvents.
3. Polymerizing finishes (thermosetting) in which molecular change takes place under the influence of heat.

Air Conditioning

An All Year Gas Air Conditioning Unit.
Gas Abstracts J. Massier November 1945 Institute of Gas Technology

The general construction and operation of the gas-fired Servel Air Conditioning Unit is described. Projected models will have cooling capacities of 3.5 and 7.5 tons of refrigeration. The 3 ton unit will have a heating capacity of 120 M. Btu. The 5 ton units will consist of two models having heating capacities of 120 and 180 M. Btu, respectively. The 7.5 ton unit will have balanced heating capacity. Each unit consists of a steam boiler, heating coils, and an absorption refrigeration system using water vapor as a refrigerant and lithium bromide as an absorbent. Steam from the boiler is carried to heating coils during the heating season but during the summer this steam is diverted to the generator of the absorption refrigeration system. Forced air is circulated over heated or cooled coils, as needed, and then through ducts into the living quarters.

Steel—

Changes During Heating.
Petroleum Eng. Sept. 1945

The microstructure and the hardness of 3 carbon (0.1%) steels and 6 molybdenum steels (0.1—0.2%C) (0.5% Mo) tempered at elevated temperatures below 1100°F. during periods ranging from 5 to 5000 hours were studied. The results obtained show that:

(1) The hardness of most carbon steels increased with time of tempering. Further increase in time caused a decrease in about the same rate as all three temperatures (900, 1000 and 1100°F.) Increase in hardness was greatest at 1000°F.

(2) Carbon steel was not influenced by the method of deoxidation.

(3) Annealed molybdenum steel behaved quite similarly to carbon steel but normalized molybdenum steel behaved differently.

(4) Normalized molybdenum steel formed spheroids and agglomerates. These increased with addition of aluminum and silicon. Aluminum alone gave a lower rate.

(5) The rate of graphite formation was the same for all carbon steels but for molybdenum samples the rate increased with the addition of an aluminum and silicon.

Miscellaneous

Product Engg., v. 16, *pp.* 676-680, *Oct.*, 1945.
Thompson, J. E.
Control of drawings and prints in engineering department operation.

Sci. News Letter, v. 48, *p.* 233, *Oct.* 13, 1945.
Gas-diesel engine has higher thermal efficiency.

Metal Progress, v. 48, *pp.* 806-814, 832., *Oct.*, 1945
Osborn, H. B., Jr. and others.
Important achievements of induction heating.

News of the Gas Industry

Two Operating Groups of Columbia System Combine

In a move aimed at the further simplification of one of the nation's largest natural gas companies, Stuart M. Crocker, president of the Columbia Gas & Electric Corporation, announced that two of the Columbia System's operating groups will be combined under one management as of the first of April, 1946.

Columbia's Binghamton Group operating in southern New York and northern New Jersey will become part of the system's Pittsburgh Group which comprises production, transmission, and distribution properties in western and southern Pennsylvania, eastern Ohio, northern West Virginia, and western Maryland.

The companies comprising the enlarged group will have headquarters in the Union Trust Bldg., Pittsburgh, Pa. The Binghamton Group companies namely Binghamton Gas Works, Home Gas Company, The Keystone Gas Company, Inc., and the Eastern Pipe Line Company in New Jersey will be managed from this headquarters together with the presently operated Pittsburgh Group Companies, The Manufacturers Light and Heat Company, Natural Gas Company of West Virginia, Cumberland and Allegheny Gas Company, and Gettysburg Gas Corporation.

Charles E. Bennett, since 1935 president of the Pittsburgh Group, will head the expanded operations. Irving K. Peck, for 11 years president of the Binghamton organization will be vice president and general manager of the combined properties.

W. P. Sadler, now treasurer of the Pittsburgh affiliated companies will be elected a vice president on April 1, and will supervise financial policies of the enlarged group. J. V. Colley, treasurer of the Binghamton Group comes to Pittsburgh on that date to succeed Mr. Sadler as treasurer of the combined operations.

United Gas Corporation Announces Personnel Changes

Major personnel changes within United Gas Corporation and its subsidiaries were announced recently by N. C. McGowen, United Gas president. Heading the list of nine long-time employes advanced in the organization is L. V. Tracht, of Houston, who was elected treasurer of the corporation.

Tracht was retained by McGowen as a statistician for a predecessor of United Gas in 1929, and has been assistant treasurer of the corporation's operating division for nine years, with headquarters in Houston. His new post will take him to Shreveport, where the general offices are located. He will be succeeded by A. J. Biard, also of Houston.

C. E. Bennett

New comptroller of the United Gas Corporation is R. E. Hull, of Shreveport, former general auditor. He will also serve in the comptroller position for United Gas Pipe Line, Union Producing and United Oil Pipe Line companies, subsidiaries of the corporation.

Succeeding Hull as general auditor is F. E. Waltrip, Shreveport, who was assistant to Hull for several years. Like his predecessor, he will act as auditor for the corporation and its three associated companies.

J. H. Miracle was elected secretary of the corporation.

Four other Shreveport men were advanced to higher positions in United Gas Pipe Line Company. They are M. V. Cousins, new director of personnel; D. R. Pflug, assistant chief engineer; H. W. Egger, superintendent of compressor stations; and H. W. Eiser, superintendent of transportation for all three subsidiary companies.

United Gas Corp. Announces Managerial Promotions

W. B. Head, Jr., has assumed his duties as manager of the Houston division of the United Gas Corporation following retirement of K. L. Simons, head of the division since 1930, it was announced by United Gas vice president, J. V. Strange. After 44 years in the utility business, Mr. Simons, who is 67 years of age, retired to return to his native South Carolina to make his home.

As head of the Houston division, Mr. Head will be in charge of gas distribution facilities serving many thousands of residential commercial and industrial customers.

He won Nationwide recognition in utility circles in 1935 when he served as President of the Oklahoma Utilities Association and again in 1940 when he was named vice president of the Missouri Utilities Association.

James A. Wilson, who was manager of the United Gas, Monroe, La., division, was raised to assistant manager of the Houston division. He entered the gas utility field as an employee of the Houston Gas and Fuel Co. in 1928. He has served successively as commercial salesman for United Gas in the Southwest Texas area, as district manager for United Gas at Liberty, as district sales manager at Beaumont, sales manager for the entire system in Houston and as manager of the Longview and Monroe, La., division.

Irving K. Peck W. P. Sadler J. V. Colley

Coke and Byproducts

Preprint from Minerals Yearbook for 1944 has been issued as a 56 page pamphlet by U. S. Dept. of the Interior, Bureau of Mines, covering Coke and Byproducts.

It is a complete summary of the subject and includes the following excerpts:

Byproduct ovens.—The tremendous wartime construction program in the byproduct-coke industry was virtually completed in 1944, when the number of new ovens contracted for and placed in operation since 1939 totaled 1,973 with a maximum annual coke capacity of 10,651,300 tons. An analysis of the new ovens built since 1939 shows that 1,638 new ovens with a yearly coke capacity of 8,924,000 tons have been built for companies directly engaged in the production of iron and steel. The remainder have been built for merchant plants or for gas companies, from which coke and gas is manufactured for industrial and domestic use. In addition to new ovens, 14 batteries consisting of 758 ovens have been completely rebuilt since 1939, raising the number of new and rebuilt ovens to 2,731.

Gas-house coke.—The production of coke from coal-gas retorts in 1944 totaled 878,632 tons valued at $7,078,113, an increase of 2 per cent in output and 5 per cent in value over 1943. Vertical retorts and miniature gas ovens furnished 55 per cent of the output, and the remainder was produced in horizontal retorts. Gas-house coke was produced at 90 plants operating in 27 States compared with returns from 95 producers in the same States in 1943. In order of output the leading States were Massachusetts, Wisconsin, New York, Pennsylvania, and Michigan; they supplied 67 per cent of the total.

The disposal of gas-house coke in 1944 followed in general the pattern established in previous years, and 45 per cent of the production was consumed at producing plants. Of the quantity used by producers, 48 per cent was used for heating benches, 36 per cent for making water gas, and the remaining 16 per cent for making producer gas, raising steam, heating buildings, and other miscellaneous uses. The shortage of solid fuels for domestic purposes in certain areas directed attention to available supplies of gas-house coke. Sales for domestic use amounted to 423,675 tons (90 per cent) of the total deliveries. Sales for use in the manufacture of water gas and other industrial purposes were not extensive and accounted for the balance—49,823 tons.

Additional data on coal-gas plants are given in Bureau of Mines Mineral Market Report M. M. S. 1280.

The complete pamphlet is for sale by the Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C. Price 15 cents.

No "Superior" Use for Gas

In a report analyzing natural gas reserves, demand and other matters, made by the Standard Oil Co. (New Jersey) economics, research and producing staffs, it is pointed out that there is no "superior" use for natural gas to which it need be diverted at the expense of other uses. The report emphasizes, on the other hand, that rather than placing any restrictions on gas uses, a major problem of the industry is that of encouraging and developing wider use. The desirability of expanding the near future marketing of gas is strengthened, it is suggested, when the probability of eventual use of atomic and other basic sources of power is considered.

Asserting that there now exists sufficient gas for all known or contemplated needs over the foreseeable future, the report declares that restrictions on exports from the producing States would benefit primarily the coal industry while backing up gas at the source with resulting tendency toward depressed price and waste.

The Gas Turbine

Speaking before the American Society of Mechanical Engineers at the Engineering Societies Building, 29 West 39th Street, New York, on February 6th, J. I. Yellott, director of research of the Locomotive Development Committee, said that experiments carried on at Johns Hopkins University, the Institute of Gas Technology, Chicago, and elsewhere have shown that such a turbine may cut fuel costs to one-third or one-fourth of their present level.

Mr. Yellott declared the thermal efficiency of a gas turbine will reduce coal requirements to about 25 per cent of the consumption for a standard steam locomotive. He said the gas turbine as a prime mover will be tremendously important where no adequate water supply exists.

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NEGA Annual Meeting Program On March 21-22

An extremely strong program has been prepared for the 19th Annual Business Conference of The New England Gas Association at the Hotel Statler, Boston, on March 21 and 22. This will be the first annual meeting conference which the NEGA has held in 2 years and the first 2-day annual affair which it has held in 3 years because of the war.

There are 16 different presentations on the program—including a forum, a radio broadcast, and illustrations of the use of industrial gas in New England during the war. The 16 presentations are divided into 2 main groups: (1) subjects of a more or less technical nature covering the several phases of the gas industry, and (2) broad, non-technical subjects which would be timely before any association group today.

The technical presentation will cover market research, installment appliance financing, utility commission and court developments, home service, production developments, the gas industry promotion program, gas company radio promotion, and addresses by President Boothby of A.G.A., President Harvey of G.A.M.A., President Reynolds and Executive Secretary Belden of NEGA.

The non-technical presentations will be featured by a labor relations forum of 7 persons and by addresses covering human relations in industry and general management problems in the new era.

Appliance Sales Set All Time High in Brooklyn, N. Y.

Despite continuing shortages, net delivered appliance sales of Brooklyn Union Gas Co. topped all records for January. They aggregated $259,133—more than a quarter million dollars—against a previous high of $181,170.

Sixteen hundred sixty-seven appliances were delivered that month. The number included 1,055 refrigerators, 254 ranges, 149 house heaters, 115 water heaters and 13 space heaters—a total of 1,586 domestic units. Also included were 81 industrial appliances—71 of which went to industrial customers and 10 to commercial customers.

Dollar sales were 43% higher than in January, 1942, when customers were deluging the company with orders for appliances in anticipation of the wartime scarcities which were later to develop.

Domestic appliance deliveries by divisions during January were: Retail, 996 units; Apartment House, 475; Commercial, 60; New Development, 51; Industrial, 4.

In addition to the company's deliveries, cooperating dealers delivered 59 house heaters direct to customers.

More than 16,000 customers are using gas to heat their homes, factories and commercial establishments, a recent survey revealed.

The survey, made during December, showed that the company has 14,032 residential customers and 2,152 No. 4 rate customers using gas for heating.

Thirty-Fifth Annual Meeting Southern Gas Assn.

A large attendance is expected to attend the 35th annual meeting of the Southern Gas Assn., to be held in Galveston, Texas, March 21st and 22nd.

Convention headquarters will be at both the Buccaneer and Galvez Hotels. Meetings will be held in both places, with general sessions scheduled for mornings and sectional meetings for afternoons of the two days. There will also be a general luncheon and installation of officers on the second day.

Sectional meetings will be devoted to sales, operating, industrial and commercial, and accounting. The Home Service Section will hold its meeting the day before the Convention opens, on March 20, so that members attending this section may also attend other sectional meetings during the following 10 days.

Frank S. Kelly, Jr., association president, Arkansas Louisiana Gas Company, Shreveport, will preside at general sessions and also at the general luncheon and installation. The first day of the Convention luncheon meetings will be devoted to sectional groups.

Advance program plans announced by J. M. Lynn, Jr., Lone Star Gas Company, Dallas, who is general program chairman and also chairman of the Sales Section, include the following speakers for the general sessions: Clifford Johnstone, Pacific Coast Gas Association, San Francisco; R. H. Hargrove, Vice President of the American Gas Association, United Gas Corporation, Shreveport; Warren Whitney, National Cast Iron Pipe Division, James B. Clow and Son, Birmingham; Charles C. Wine, Chairman of Arkansas Public Service Commission, Little Rock; Lyle C. Harvey, President of Bryant Heater Company, Cleveland, who is President of AGA Equipment Manufacturers; H. Carl Wolf, Managing Director of AGA, New York.

Indiana Gas Association

The Indiana Gas Association will hold its annual convention at French Lick Springs Hotel, French Lick, Ind., on May 9th and 10th. E. D. Anderson is Chairman of the Program Committee.

Small meetings in lieu of conventions have been held during the war. The coming meeting revives the pre-war conventions.

Secretary-Treas. is Paul A. McLeod, 816 Traction Terminal Bldg., Indianapolis 9.

Southern Gas Association

Headquarters for the coming meeting of Southern Gas Association in Galveston on March 21-22 will be at the Galvez and Bucaneer Hotels.

A one-day Home Service Workshop under the direction of Miss Vivian Marshall will be held March 20th at the Galvez Hotel preceding the general meeting. A large attendance is anticipated.

CONVENTION CALENDAR

March

11-12 *Oklahoma Utilities Assn.* Annual Convention, Biltmore Hotel, Oklahoma City.

19 *Federal Power Commission Hearing,* Charleston, W. Va.

21-22 *New England Gas Association,* Annual Business Conference, Hotel Statler, Boston.

21-22 *Southern Gas Association,* Galveston, Tex.

29-30 *American Gas Assn.* Conference on Industrial and Commercial Gas, Commodore Perry Hotel, Toledo, Ohio.

April

8-10 *Mid-West Gas Association.*

16-18 *A.G.A.* Distribution and Motor Vehicle Conferences, Hotel Stevens, Chicago.

23-25 *Southwestern Gas Measurement Short Course,* University of Oklahoma, Norman, Okla.

May

7-8 *A.G.A. Natural Gas Department,* Annual Spring Meeting, Cincinnati, Ohio, Gibson Hotel.

7-9 *Pennsylvania Gas Assn.* 38th Annual Meeting, Wernersville, Pa.

7-9 *National Association of Corrosion Engineers,* Annual Meeting and Convention, President Hotel, Kansas City, Mo.

17-24 *International Petroleum Exposition,* Tulsa, Oklahoma.

June

3-5 *American Gas Association Joint Production and Chemical Committee Conference,* Hotel Pennsylvania, New York.

18-21 *Canadian Gas Association,* 39th Annual Convention, Manor Richelieu Hotel, Murray Bay, P. Q., Canada.

October

7-11 *American Gas Association,* Annual Meeting, Atlantic City, N. J., Convention and Exhibition.

Oklahoma Utilities Assn.

The Annual Convention of the Oklahoma Utilities Association is being held in Oklahoma City at the Biltmore Hotel on March 11th & 12th. Mr. S. I. McElhose of the Public Service Co. of Oklahoma is Chairman of the Convention Committee.

Peoples Gas of Chicago Features 97th Anniversary of Service

The February number of *Gas News* issued by Peoples Gas Light and Coke Co. of Chicago outlines with illustrations the opening chapter of the history of this organization and predecessors.

On February 12th, 1849 a charter was granted the Chicago Gas Light & Coke Co. to "manufacture and sell gas to be used for lighting any streets and buildings in the city and to lay mains and pipes for the purpose. . . ."

September 4th, 1850, saw gas turned on in the street lights. "But the City Hall with its 36 burners is the brightest of all, night being transformed to mimic day"... so said the *Evening Journal* of September 5th.

At that time the Company had about 4½ miles of mains and 125 customers who paid $3 a thousand cu. ft.

By February 12th, 1855, the present Company was granted a perpetual charter. The story as presented is an interesting and informative retrospect.

Business Reference Library

Library Service to Business, Its Place in the Small City, by Marian C. Manley, has just been published by the American Library Association, 520 North Michigan Ave., Chicago 11. 80 pages, price $1.25.

Telling how to initiate or improve library service to the community's business interests, the book also gives pointers on the selection and use of information, on the library's location, organization, and staffing.

Among the subjects covered are: The contribution even a modest business service can make to the community; library adjustments in setting up such a service; types of business information, how used, by whom used; where it is found; and interpreting the service to the community. A 20-page annotated bibliography, *Building A Business Library Collection,* intended as a purchasing guide for the small library is appended.

The author is librarian of Newark's Business Library. She heads the A. L. A.'s Committee on Relations with Business Groups, and is also Chairman of the Committee for Library Service of the C. E. D. (Committee for Economic Development).

New Natural Gas Field in U.S.S.R.

The Geological Trust for Research has found a new natural gas field near Stalingrade, in the lower Volga Valley. One boring has produced natural gas very rich in Methane—says *Le Courrier des Petroles.*

Natural Gas Production in South-West France

The New Natural gas field of Aquitania, South-West France produced 237-million cu. ft. of gas and 330-tons of gasoline during the month of July, 1945.

Mechanical Blue Flame Display Originated by Equitable Gas Company

Utilizing the optical illusion caused by a spinning object, the Equitable Gas Company has had built and installed on the first floor of the Central Building an animated flame display which features the well-known, idealistic flame shape cut out of sheet iron, mounted on a vertical shaft, and rotated by an electric motor.

Properly lighted and painted, the same optical illusion that gives a spinning coin the appearance of a transparent ball gives this spinning metal flame the appearance of the real thing.

Animated Flame Display

The motor used is a regular display animator motor with speed reduction obtained by belt drive. The revolving flame-shaped sheet metal is painted on both sides using alternate cones of light and dark blue.

It is placed in a recess in the display panel wtih circular or other conventional shape opening. Against a dull black background with proper concealed illumination, the effect is most realistic and attractive.

The animated flame display in the picture was designed by D. W. Frye, Sales Promotion Department, for store or office use, particularly for the display of small New Freedom Gas Kitchen models, with provision for the changing of the models and posters as needed.

The unit was built by Display Studios Inc., 6633 Hamilton Ave., Pittsburgh 6, Pa., from whom further details and cost may be obtained.

Utility Outlook Bright in Brooklyn, N. Y.

Clifford E. Paige, President, the Brooklyn Union Gas Co., recently stated his belief in the future of gas, in these words.

"We are passing through the most trying phase of reconversion. The changeover from war production to supplying peacetime needs is proceeding—slowly here, more rapidly there. New enterprises are being launched—their sponsors hopeful in spite of the numerous uncertainties.

"We in the gas business have reason to view the future with confidence. Our product and our service are in demand. Their value is more widely recognized. There is a tremendous demand for gas house heating, for gas ranges, gas refrigerators and gas water heaters. The rapid expansion of our business is delayed only by the time lag in getting equipment and appliances.

"Our organizations are being strengthened by the return of the men and women from the armed services. The veterans are eager to get back to work, anxious to help in building the peacetime world. They are happy to find their old jobs—or better ones—awaiting them.

"In anticipation of a very substantial increase in the use of gas, our company is embarked on a $5,500,000 expansion program. Two of the most modern automatic sets for making carburetted water gas have been installed. We are laying new mains, adding pumping equipment, enlarging our purifying facilities. The result will be even better service for our 800,000 customers in Brooklyn and Queens.

"We strive constantly to improve our service because we realize that customers are not interested in gas, but only in what gas will do for them. Rates are low. Even large volume customers find the cost a very small part of their budgets.

"Backed by a service second to none and with advantages which gas alone can offer, we look forward with confidence to the growth of our business in step with the sure growth and development of our community."

Brooklyn Union Gas Co. Announces Changes in Organization

James J. Deely, New Business Manager of The Brooklyn Union Gas Company, announced the following appointments and reassignments, effective February 1:

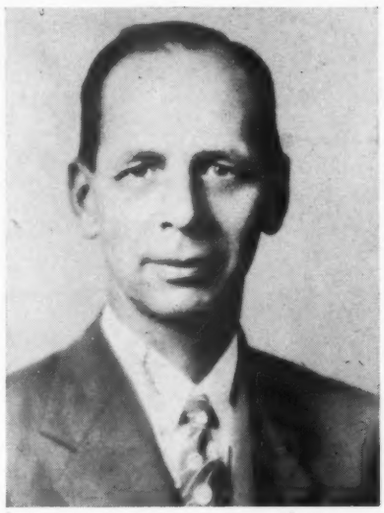
Joseph A. Reynolds, from acting retail sales supervisor to domestic sales manager; John B. Frost, from assistant industrial sales manager to retail sales supervisor; Carl Below, from district sales manager to supervisor, apartment house division; Edward A. Koster, from supervisor, apartment house and new development divisions, to supervisor, new development division; Carlton W. Roll, from industrial sales engineer to assistant industrial sales manager; Henry A. Diekmann, from coordinator to supervisor, house heating division; and Richard G. Kopff, from district sales manager to coordinator.

American Gas Association Activities

A.G.A. Has Membership Committee

President E. J. Boothby of the American Gas Association has appointed a Membership Committee of leading executives with J. N. Greene, President of the Alabama Gas Company, Birmingham, Alabama, as Chairman. While the Association enjoys the membership of most of the gas companies in the United States, the new committee will make an effort to secure the enrollment of the comparatively few non-member gas companies in an effort to make the Association as nearly 100 per cent representative of the industry as is possible. Other problems in connection with all classes of membership will be assigned to the committee for study and recommendation.

Each member of the committee will cover a section of the country. Mr. E. H. Eacker, Vice President, Boston Consolidated Gas Company, Boston, Mass., will handle the New England states; John A. Frick, President, Allentown-Bethlehem Gas Company, Allentown, Pennsylvania—Delaware, New Jersey, New York, and the Manufactured Gas Companies in Pennsylvania; Edward M. Borger, President, Peoples Natural Gas Company, Pittsburgh, Pa. —Ohio, West Virginia, Kentucky, and Natural Gas Companies in Pennsylvania; R. C. Brehaut, Manager, Suburban Companies, Washington Gas Light Company, Washington, D. C.—District of Columbia, Maryland, and Virginia; A. H. Stack, President, Tampa Gas Company, Tampa, Florida—North Carolina, South Carolina, Georgia, Alabama and Florida; D. H. Frazer, Jr., President, Battle Creek Gas Company, Battle Creek, Mich.—Michigan, Indiana, Illinois and Wisconsin; B. F. Pickard, President, Interstate Power Company, Dubuque, Iowa—Minnesota, Iowa, Nebraska, North Dakota and South Dakota; E. H. Lewis, Vice President, St. Louis County Gas Company, Webster Groves, Missouri—Missouri, Kansas, Oklahoma and Arkansas; Chester L. May, Vice President, Lone Star Gas Company, Dallas, Texas—New Mexico, Texas, Louisiana, Mississippi and Tennessee; F. T. Parks, Vice President, Public Service Company of Colorado, Denver, Colorado—Montana, Wyoming, Colorado, Utah and Nevada; N. Henry Gellert, President, Seattle Gas Co., Seattle, Washington — California, Arizona, Oregon, Washington and Idaho; C. P. Rather, President, Southern Natural Gas Company, Birmingham, Alabama—Pipe Line Companies. Kurwin R. Boyes, Secretary of the American Gas Association, will be the Secretary of the Membership Committee.



Joseph N. Greene

Knapp Promoted by A.G.A. Laboratories

Kenneth R. Knapp has been appointed Assistant Director of the American Gas Association Testing Laboratories in Cleveland and Los Angeles, H. Carl Wolf, Managing Director of the Association, announced recently. He will serve as assistant to R. M. Conner, Director of the A. G. A. Testing Laboratories, in supervising the testing and research activities conducted by two laboratories of the gas industry's trade association.

NEW BOARD OF DIRECTORS OF THE AMERICAN GAS ASSOCIATION

(Seated Left to Right) Maj. T. J. Strickler, vice president and general manager, Kansas City Gas Co.; Chas. M. Cohn, chairman of board and president, Consolidated Gas Electric Light & Power Co. of Baltimore; Kurwin R. Boyes, Secretary, A.G.A.; R. H. Hargrove, vice president, A.G.A., and vice president and general manager, United Gas Pipe Line Co.; Gladys Hanshaw, A.G.A.; Everett J. Boothby, president, A.G.A. and vice president and general manager, Washington Gas Light Co.; Colonel Hudson W. Reed, vice president, A.G.A., and president, The Philadelphia Gas Works Co.

(Standing Left to Right) Randall J. LeBouef, Jr., Counsel, A.G.A.; H. Leigh Whitelaw, Managing Director, G.A.M.A.; Lyle C. Harvey, president, G.A.M.A. and president, Bryant Heater Co.; R. M. Conner, Director, A.G.A. Testing Laboratories; Edward P. Noppel, chairman A.G.A. Co-ordinating Committee on Research and general consultant, Ebasco Services Incorporated; Henry H. Morse, vice president, Florence Stove Co.; Henry Fink, vice president and general manager, Michigan Consolidated Gas Co.; Earl H. Eacker, vice president, Boston Consolidated Gas Co.; Dorr P. Hartson, chairman, National Advertising Committee, A.G.A., and vice president and general manager, Equitable Gas Co.; C. S. Goldsmith, Engineer, The Brooklyn Union Gas Co.; Norton McKean, president, American Meter Co.; Alvan H. Stack, president, The Tampa Gas Co.; John J. Quinn, chairman, Residential Gas Section, A.G.A. and sales manager, Boston Consolidated Gas Co.; Joseph N. Greene, chairman, Membership Committee, A.G.A. and president, Alabama Gas Co.; Frank H. Adams, chairman, Manufacturers Section, A.G.A., and president, Surface Combustion Co.; George E. Whitwell, chairman, Laboratories Managing Committee, A.G.A. and vice president in charge of sales, Philadelphia Electric Co.; H. Carl Wolf, Managing Director, American Gas Association.

ROCKWELL MANUFACTURING COMPANY
MEETING OF DIVISIONS AND SUBSIDIARIES

Left to Right: Top Row: J. E. Brown, Assistant to General Sales Manager, Rockwell Manufacturing Co.; W. F. Crawford, President Edward Valves, Inc., East Chicago, Ind.; E. W. Meyers, Jr., Controller, Rockwell Manufacturing Co.; A. H. Chatley, Vice President, The Delta Manufacturing Co.; C. S. Bygate, Assistant General Purchasing Agent, Rockwell Manufacturing Co., W. H. Newbaker, General Purchasing Agent, Rockwell Manufacturing Co.; H. F. Zorn, President, The V & O Press Co., Inc.; I. P. Gassman, Sales Manager, Arcade Manufacturing Division.

Second Row: L. X. Ely, Vice President, The Monessen Foundry and Machine Co., Monessen, Pa.; E. E. Matheson, Sales Manager, Nordstrom Valve Co., Oakland, Calif.; A. R. Whittaker, General Manager, Brooklyn Plant, Pittsburgh Equitable Meter Division; B. C. Trublood, General Manager, Arcade Manufacturing Division, Freeport, Ill.; H. F. Sacknus, Factory Manager, Pittsburgh Plant, Pittsburgh Equitable Meter Division; R. C. DuBrucq, Vice President, The Crescent Machine Co., Leetonia, Ohio; Andrew Kuhl, Superintendent, The Monessen Foundry and Machine Co.; W. A. Marsteller, General Advertising Manager, Rockwell Manufacturing Co.; H. C. Stuckeman, Vice President, The Delta Manufacturing Co., Milwaukee, Wis.

Front Row: T. I. Shriver, Chairman, The V & O Press Co., Inc., Hudson, N. Y.; E. W. Meyers, Treasurer, Rockwell Manufacturing Co.; A. J. Kerr, Vice President of Sales, Rockwell Manufacturing Co.; Colonel W. F. Rockwell, Chairman and President, Rockwell Manufacturing Co.; W. F. Rockwell, Jr., Vice President and General Manager, Rockwell Manufacturing Co.; W. S. Potter, Vice President of Research, Rockwell Manufacturing Co.; H. S. Rockwell, President, Rockwell Machine Co., Hopewell, N. J.

GAS METERS

ARMY E NAVY

RADAR

Lambert Meter Co.
Plainfield, N. J.

GLOVER-WEST

CARBONIZING SYSTEMS

• *boost* production
• *cut* fuel costs

More than 440 CARBURIZING PLANTS, in 24 countries, testify to the outstanding advantages of GLOVER-WEST Systems.

Today, with the hopes and well-being of people all over the world depending on the speed and efficiency of our output, these advantages cannot be overstressed.

GLOVER-WEST CARBONIZING SYSTEMS
- ***LOWER*** Fuel Consumption and Maintenance
- ***FACILITATE*** Operation
- ***PRODUCE*** dryer, cooler Coke
- ***REQUIRE*** less Ground Area
- ***INSURE*** greater Flexibility

WEST GAS IMPROVEMENT CO.
424 Madison Ave., New York 17, N. Y.

Rockwell Manufacturing Company Brings Subsidiaries Together for Unique Operating Clinic

A conference unique in American industrial management was held in Pittsburgh recently when the operating heads of the divisions and subsidiaries of Rockwell Manufacturing Company met to coordinate their diversified manufacturing, engineering, research, purchasing and marketing facilities.

W. F. Rockwell, Jr., Vice President and General Manager of the Rockwell Manufacturing Co., who conducted the meetings, explained that the expanding peacetime production of the Company's widely scattered plants made it difficult for the plant managers to keep fully abreast of the new developments within other plants.

"One of the biggest advantages of a Company such as ours is the integration of manufacturing facilities and exchange of manufacturing know-how," Mr. Rockwell said. "In this meeting we set aside time for discussion of all management problems our plants have in common—sales, advertising, research, purchasing, industrial relations, accounting and interplant production.

"Free exchange of information on these problems helps us stabilize employment at the highest level in all plants, lowers manufacturing and distribution costs, expands our markets, and short cuts engineering and research projects. What one plant might otherwise spend thousands of dollars to learn, can be taken from the experience of another unit."

Included among the products of the Rockwell Manufacturing Company are such differing products as meters, valves and machine tools.

Subsidiaries and divisions represented at the conference included: Pittsburgh Equitable Meter Division, Pittsburgh and Brooklyn; Nordstrom Valve Co., Pittsburg and Oakland, Calif.; Rockwell Machine Co., Hopewell, N. J.; The Delta Manufacturing Co., Milwaukee, Wis.; The V & O Press Co., Hudson, N. Y.; Edward Valves, Inc., East Chicago, Ind.; The Crescent Machine Co., Leetonia, Ohio; The Monessen Foundry and Machine Co., Monessen, Pa.; and Arcade Manufacturing Division, Freeport, Ill.

Executives of Stacey Bros. Gas Construction Co., Cincinnati, Ohio, preparing to tell their stories to the rest of the Dresser Industries, Inc., executives, salemen, and engineers, assembled at the Dresser Joint Sales and Engineering Conference at Mineral Wells, Texas. Left to right: H. H. Liese, Assistant Chief Engineer; H. C. Brinkman, Chief Engineer; Eric Flaschar, Manager of Stacey Dresser Engineering; W. E. Gruening, President; A. E. Harvey, Vice President; W. E. Mikolasy, Sales Representative.

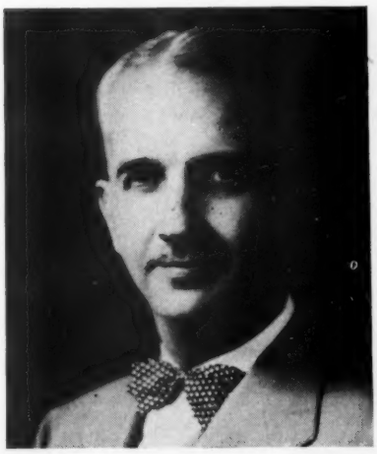
Kerr Named Vice President in Charge of Sales for Rockwell Manufacturing Company

A. J. Kerr, formerly General Sales Manager, has been elected Vice President of sales of the Rockwell Manufacturing Company, Pittsburgh, Colonel Willard F. Rockwell, President and Chairman, has announced.

Mr. Kerr has been associated with the Company for more than 20 years. His early career was as District Manager, Tulsa office of the Pittsburgh Equitable Meter and Nordstrom Valve Companies, now divisions of the Rockwell Manufacturing Company. In 1944 he was made General Sales Manager.

A Mechanical Engineering graduate of Carnegie Institute of Technology, he has been active in many Engineering Societies and at present is a Director at Large as a member of council of the American Society of Mechanical Engineers.

As Vice President of Sales, Mr. Kerr will coordinate the marketing activities of the various subsidiaries and divisions.



A. J. Kerr

CLEVELAND

"A" TYPE METERS
"B" TYPE METERS
DIAPHRAGMS

Cleveland Gas Meter Co.
ESTABLISHED 1875
2009 Rockwell Ave., Cleveland 14, O. Phone CHerry 2351

CONNELLY IRON SPONGE

High in efficiency . . . low in cost. In hundreds of plants throughout the country, Connelly Iron Sponge has proven itself . . . the finest purification material on the market. Not only does it lower your purifying cost but its high activity and capacity tends to reduce distribution and service complaints because of the cleaner gas which ultimately lowers operating and maintenance costs.

If you have a problem in gas purification, Connelly's 68 years of experience is at your service. Our engineers can help you . . . there is no obligation on your part.

CONNELLY IRON SPONGE & GOVERNOR CO.
ELIZABETH, N. J. LOS ANGELES, CALIF.
3154 SOUTH CALIFORNIA AVE., CHICAGO 8, ILL.

Meter Reader Champion

Here is a challenge, addressed to utility companies all over the world:

Do you have a meter reader who can match the record of Brooklyn Union's George P. Woll, who has taken 991,754 consecutive readings without an error, or Charles V. Dillon, who has rounded out 16 years perfect reading?

Challenges should be addressed to Editor, *Gas News,* 176 Remsen Street, Brooklyn 2, N. Y.

Program for Southwestern Gas Measurement Short Course Outlined

The program for the 1946 Southwestern Gas Measurement Short Course was outlined during a meeting of the General Committee held in Oklahoma City during the latter part of January.

A large number of topics for classes were submitted to R. M. Scofield, Chairman of the Program Committee, and these served as a reservoir from which suitable subjects were selected for the program. The teacher assigned to each class will be well qualified and capable of disseminating pertinent information relative to his subject.

The Chairman of the Exhibit Committee, J. L. Griffin, reported that the companies which furnish educational exhibits have shown an unusual interest in this year's short course.

Mr. W. H. Woods announced to the General Committee that at least one more Practical Methods report would be available for distribution during the short course.

Wisconsin Southern Company Recently Purchased

The Wisconsin Southern Gas Co., Burlington, serving 4,400 gas customers in Walworth and Racine Counties, has been purchased by H. K Harley, R. M. Hayden of Madison, K. D. Knoblock of Chicago, and Carl A. Altenbern, Burlington.

K. D. Knoblock, a consulting engineer of Chicago, has been elected president of the company. He served in various engineering capacities in connection with Wisconsin Southern and was vice-president and chief engineer several years ago. Altenbern has been elected vice-president and secretary, and has been associated in utility operations and engineering work with Mr. Knoblock for 17 years. Altenbern has served as general manager for the past 7 years and will continue to manage the company. A. W. Schmidt, Chicago, was elected vice-president and treasurer, and W. R. Glick, Burlington, was re-elected assistant secretary and assistant treasurer.

The headquarters of the company will be at Burlington. No changes will be made in any of the operating personnel or company policy.

The property was owned by the American Utilities Service Corp., which was ordered by the SEC to divert its holdings.

L. P. Gas in Wisconsin

Peoples Gas Co., Marshfield, Wisconsin, has been given permission by the Public Service Commission to convert its plant from manufactured gas to liquid petroleum.

Gas Service, Inc., of Wisconsin Rapids, will erect a new 18,000 gallon liquefied petroleum bottle gas plant ot Omro this spring.

Natural Gas a Magnet for Gulf Coast Industry

Natural gas and abundant raw materials combine to stimulate the industrial growth of the Texas Gulf Coast.

For example, Houston's vast supply of natural gas, ample industrial water supply, low cost electric service, deepwater port with eighteen rail outlets, and hard surfaced highways reaching every section of the Southwest, make Houston a strategic center for manufacturing and distribution.

Over 80 per cent of the nation's supply of sulphur is produced within sixty miles of Houston. Sulphur, being the number one chemical raw material, is a great asset toward the present and future growth of the chemical industry in this area.

Petroleum and natural gas are important raw materials in the manufacture of synthetic rubber, plastics, fabrics, solvents, explosives, tires, resins and many other synthetic organic chemicals.

The tin smelter located at Texas City is in itself indicative of the Gulf Coast Area's ability to serve chemical industry. This plant is the only tin smelter in the United States, and much study was given to the location of it.

The Houston plant of the Consolidated Chemical Industries, Inc., manufactures large tonnages of Sulphuric Acid, Hydrochloric Acid, Salt Cake and other chemicals. One unit in this plant utilizes old spent acid sludge from refineries, which otherwise would be a hazardous waste, in the regeneration of water white sulphuric acid. This is done by burning the acid sludge with natural gas to form SO_2 which is purified and sent through reactors to form a pure grade of Sulphuric Acid.

GENERAL COMMITTEE OF SOUTHWESTERN GAS MEASUREMENT SHORT COURSE

FRONT ROW: Left to Right (seated) E. C. McAninch, Oklahoma Natural Gas Company, Ardmore, Oklahoma; Earl Kightlinger, Arkansas Louisiana Gas Company, Shreveport, La.; James L. Griffin, Northern Natural Gas Company, Omaha, Nebraska; Miss Kate A. Niblack, Oklahoma Utilities Association, Oklahoma City; R. M. Scofield, Lone Star Gas Company, Dallas, Texas; C. A. Gibson, General Chairman, Cities Service Gas Company, Bartlesville; Dean W. H. Carson, University of Oklahoma, Norman, Oklahoma; C. E. Terrell, Southern Natural Gas Company, Birmingham, Alabama; W. H. Woods, Gulf Oil Corporation, Houston.

BACK ROW: Left to Right (standing) J. H. Satterwhite, American Meter Company, Tulsa; W. R. McLaughlin, Pittsburgh Equitable Meter Division, Pittsburgh, Penna.; Wm. F. Lowe, Natural Gasoline Association of America, Tulsa; W. A. Brewster, Arkansas Louisiana Gas Company, Shreveport, La.; T. S. Whitis, West Texas Gas Company, Lubbock, Texas; Pat H. Miller, Panhandle Eastern Pipe Line Company, Kansas City, Missouri; E. L. Stark, The Foxboro Company, Dallas; George E. Greiner, Phillips Petroleum Company, Bartlesville; Ben F. Worley, United Gas Corporation, Houston.

Roper Promotions Include W. J. Foster and S. W. Weill

Two well known figures in the gas industry, W. J. Foster and S. W. Weill, have been promoted to executive positions of the Geo. D. Roper Corporation.

W. J. Foster has been named vice president and general sales director for the Geo. D. Roper Corporation at Rockford, Illinois, and S. W. Weill was appointed eastern manager with headquarters in Philadelphia.

W. J. Foster

Mr. Foster's activities in appliance merchandising qualify him for his new duties. He has represented Roper in the eastern states for over 16 years. Assuming new responsibilities as the company expanded, he has advanced steadily to eastern manager, then vice president and now vice president and general sales director.

Other additions to the Roper Corp. sales organization are:

Ben L. Landis, formerly with the War Manpower Commission. He will work with S. W. Weill, eastern manager, in the Pittsburgh area. Following his discharge in World War I, Mr. Landis entered the appliance selling field. He was with the Harrisburg Gas Co. at one time.

R. E. MacIntosh has joined the Roper sales organization in the Boston area with headquarters at 108 Arlington St., Boston. He will work closely with S. W. Weill and C. A. Hutchinson in carrying out his new duties. A native Bostonian, Mr. MacIntosh will be covering familiar territory. His first experience in the appliance field was gained as a dealer in the city of Boston during 1926-1930.

Charles W. Richardson, is a new sales representative for Roper, in Metropolitan New York, working with district manager A. F. Jenkins. In his new capacity, Mr. Richardson will cover the following territory: New York City, Brooklyn, and Queens, N. Y., and Nassau and Suffolk counties of Long Island.

J. J. Huey has recently joined the Geo. D. Roper Corporation sales organization, working with district manager J. C. Mansfield out of the Dallas office. Jim Huey is well known among gas range dealers throughout the territory he will be covering in north and east Texas.

Eastern Gas & Fuel Associates New Appointments

Announcement is made by Walter Rothenhoefer, General Manager of Sales, of further expansion in the technical service organization of Eastern Gas and Fuel Associates, Koppers Coal Division.

Charles H. Sawyer has been appointed research engineer and will supervise the Koppers Coal Division service to customers. He also will handle research in the coke and gas industry in collaboration with general research activities of Eastern Gas and Fuel Associates.

Paul J. Stein has been appointed Industrial Service Engineer. He will specialize on the recommendation of coals for industrial and utility steam generating purposes and will aid such coal users in securing best results from the coal used. He also will supervise the service offered by engineers attached to the district offices of Koppers Coal Division.

Earl B. Burton, Manager, Inspection Department, continues to head a group of experienced mining men who are responsible for preparation methods and quality standards of the coal produced at the mines of the Koppers Coal Division.

All three will make their headquarters in Pittsburgh.

Dr. Frederick Port Chf. Engr. Cribben & Sexton Co.

Cribben and Sexton Company is pleased to announce the appointment of Dr. Frederick Port as Chief Engineer.

Dr. Port received his Bachelor of Science degree in Chemical Engineering at the University of Illinois. In 1936 he attended M. I. T. as staff member and graduate student, and was granted the degree of Doctor of Science in Chemical Engineering in 1939.

Dr. Frederick Port

From 1939 to 1942 Dr. Port was associated with the Republic Steel Corporation in Chicago as head of the Combustion Engineering Department.

He comes to Cribben and Sexton Company well qualified and every indication points to new and greater advancements in design and engineering of the Company's products.

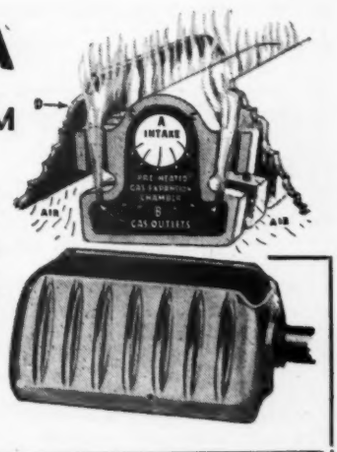
American Central Mfg. Corp. Appoints Reinbolt Sales Mgr.

Charles A. Reinbolt, Jr., who formerly handled Sales Promotion for the American Central Manufacturing Corporation, Connersville, Ind., has been appointed Advertising and Sales Promotion Manager of the corporation, it was announced recently by C. Fred Hastings, General Sales Manager.

Mr. Reinbolt, who was with the Jam Handy Organization for eight years, has been with the company five months, and in addition to his advertising and sales promotion functions he will handle publicity.

COMPLETE GAS PLANTS
INDUSTRIAL FURNACES
•
Automatic Water-Gas Controls
Hydraulically-Operated Valves
for Air, Gas, and Steam
•
The GAS MACHINERY CO.
CLEVELAND, OHIO

COLUMBIA
LITTLE GEM
GAS BURNER
A small unit which may be used singly or in series. Each unit 6½ in. long x 4 in. wide. Wide application of domestic and commercial uses. May be used in round or square steam or hot water boilers, warm air furnaces, Arcola type heaters and circulating heaters. Used commercially for heating tanks, boilers, ranges, ovens, etc. Natural, manufactured, or mixed gas. Complete combustion without pre-mixing. Write for circular.
COLUMBIA BURNER CO.
729 Ewing Street
Toledo 7, Ohio



"Gas Range of Tomorrow" Contest Brings Results

Wholehearted dealer and gas company support of American Stove Company's $18,000 Magic Chef "Gas Range of Tomorrow" design contest has helped immeasurably in building up entries to an average of 400 a week, according to S. E. Little, vice-president.

Wallace M. Chamberlain, Michigan Consolidated Gas Company sales manager, demonstrating features of the Magic Chef top burner to Warren N. Rindge, Charles M. Norton, and Wilfred P. McLaughlin, prominent Grand Rapids architects.

Typical of the many special activities conducted by gas companies and dealers was a recent dinner given by the Grand Rapids District of the Michigan Consolidated Gas Company for 21 of the city's leading architects and designers.

During the get-together all details of the contest were explained by Wallace M. Chamberlain, MCG sales manager. The meeting resulted in submittal of 13 entries. Similar meetings are being planned in other cities throughout the country.

Hundreds of entries have been received from housewives, architects and designers as well as students, artists, sculptors, salesmen, servicemen and veterans, mechanics, and even bankers.

Architectural Forum is sponsor of the Magic Chef contest. George B. Nelson, A.I.A., is professional advisor. Judges are Dr. Elaine Knowles, home economist of Teachers' College, New York; Peter Schladermundt, New York designer; Samuel Marx, Chicago architect; Edward D. Stone, New York architect, and Gardner Dailey, San Francisco architect and designer.

F. J. Hoenigmann Resigns from Cribben and Sexton Co.

Mr. George D. Wilkinson, President of Cribben and Sexton Company, has announced the resignation of F. J. Hoenigmann, Executive Vice President and General Manager.

"The benefits of his experience and guidance have had a far-reaching good effect upon our organization; and it is, of course, with regret that I must announce this termination," Mr. Wilkinson stated.

F. J. Hoenigmann

Mr. Hoenigmann who is a graduate engineer of the University of California, class of 1916, served in World War I as a First Lieutenant and Aide-de-Camp to General Hugh S. ("Iron Pants") Johnson. After the war he went with General Johnson to the Moline Plow Company, Moline, Illinois, where, during ten years of service in various positions he became General Superintendent Works Manager.

In 1930, Mr. Hoenigmann became identified with the gas industry when he came to Cribben and Sexton Company as Sales Manager.

In 1940, he was made Vice President and General Manager, in recognition of his good work. He was recently elected a member of the American Gas Association's Executive Board and Chairman of the Association's Manufacturers Section. He is also Chairman of the Gas Range Division of G. A. M. A.

Mr. Hoenigmann plans to enjoy a well earned vacation with his family. His future plans beyond that brief period are as yet unannounced.

New Estate Stove Appointees

S. C. Bernhardt, Vice President in Charge of Sales, announces the appointment of Russell L. Schwab as District Manager in New York and northern New Jersey. Mr. Schwab returns to The Estate Stove Company where he spent a number of years prior to his being commissioned a captain in the Army Air Forces.

Russell Schwab Ned Weinman

Ned Weinman has been appointed service manager for Estate. Prior to this promotion, Mr. Weinman had spent ten years in the service department. Directly before the war he was assistant to the service manager and in charge of service in the Cincinnati area. One of the first duties of Mr. Weinman will be that of conducting a service school for the service managers of the various Estate Heatrola distributors.

Servel Issues New Freedom Gas Kitchen Booklet

A new booklet showing all important points of the Servel-Designed New Freedom Gas Kitchen is being made available to gas utility companies, as announced by R. J. Canniff, advertising and sales promotion manager for Servel.

"In addition to showing all the special points of the Servel Unified Gas Kitchen," Mr. Canniff said, "We have included in this booklet complete designs with art treatment in four colors of eight different kitchens. We made every effort in this book to point up family living qualities which can be combined in efficient kitchens when the kitchen as a unit is designed to fit specific family needs.

In addition to the eight full-color kitchen designs that are shown in the booklet, separate spreads are devoted to the Servel Gas Refrigerator, "CP" gas range, and the exclusive cabinet designs of the Servel line.

GPM
IRON HYDROXIDE
The mark of
unerring dependability
in purification
GAS PURIFYING MATERIALS CO., INC.
3-15 26th Ave.
Long Island City 2, New York

"JOURNAL" GAS FLOW COMPUTERS

High Pressure
RANGE:
Cu. Ft. of Gas Per Hour—100-10,000 M
Diameter of Pipe—Inches ¾-30
Difference in Absolute Pressure—Lbs. per sq. in., 1-500
Sum of Absolute Pressures—Lbs. per sq. in., 2000-20
Specific Gravity—1.5-.35
Length of Pipe—Feet 100-5000
Length of Pipe—Miles 1-250

Low Pressure
RANGE:
Cu. Ft. of Gas Per Hour—10 to 500 M
Pipe Diameter—¾" to 48" (including standard and actual weight up to 4")
Pressure Loss—Inches .01-10
Length of Pipe—Feet 30-30,000
Specific Gravity—1.5-.35
Constants—1400-1000

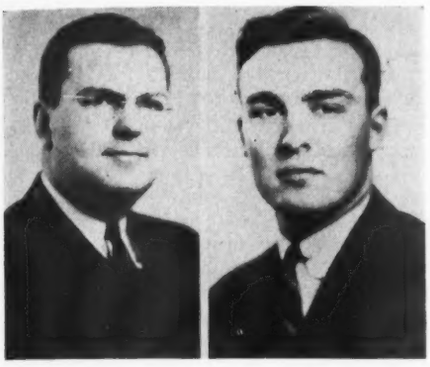
Made of durable celluloid, encased in a convenient leatherette cover with complete instructions. Actual size 6¼ x 7½

3.50 Each Postpaid

American Gas Journal
53 Park Place, New York 17

Ex-Service Men Return to Roper Staff

Included in the list of men, out of the army and returning to the Roper "fold" is W. E. Colvin. He is back on the job, in the same territory he covered prior to leaving for the service. Working closely with Eastern Manager S. W. Weill, he will be working out of the Philadelphia offices. Mr. Colvin first joined the Roper sales staff early in 1937.



W. E. Colvin J. H. Fagan, Jr.

Now that his services with the United States Navy are over, J. H. Fagan, Jr., is back again, representing the Geo. D. Roper Corporation in Minnesota, South Dakota and North Dakota. His headquarters will be maintained in Minneapolis. For several years prior to the war he was associated with his father, J. H. Fagan, Sr., Roper District Manager, with offices in Milwaukee, Mis.

W. G. Parks Jack Phillips

W. G. Parks, better known as "Bud" is another Roper man who has returned after serving a "stretch" for Uncle Sam. While in the service he held the rank of Major. He will be on duty in his old familiar territory in Iowa and Nebraska, where he will be working with District Manager T. Bergh.

Jack Phillips, recently returned from 33 months in the service, lost no time in getting back again with the sales organization of the Geo. D. Roper Corporation, Rockford, Illinois. He is working with J. K. Busch in the southern part of Indiana and western Kentucky.

Tappan Appoints Mrs. Treisch Home Service at Mansfield

Mrs. Pauline Treisch, former home service director for the Mansfield district of the Ohio Fuel Gas Company, has been named director of home service for the Tappan Stove Company, Mansfield, Ohio.

She succeeds Miss Florence Windecker who resigned to enter another field of work.

A graduate of Ohio State University, she taught home economics at Glenford, O., High School before starting with the Ohio Fuel Gas Company where she was engaged in home service activities for 10 years.

She is a member of the American Home Economics Association and was recently named a member of the American Gas Association home service committee.

Ruud Mfg. Co. Adds to Advertising Personnel

The Ruud Manufacturing Company, Pittsburgh, Pa., have added Carleton R. Cummings, and Gray L. Carpenter, both recently discharged naval officers, to their advertising department.

Prior to the war, Mr. Cummings was with the advertising department of Procter and Gamble, Cincinnati, Ohio. Mr. Carpenter is former New York representative for the Classic Guild Ltd., a London publishing firm, and was at one time with the Knickerbocker Broadcasting Company in New York.

J. H. Emery District Manager for Roberts & Mander

Roberts & Mander Stove Company, Hatboro, Pa., has announced the appointment of John H. Emery as District Manager for Metropolitan and New York State Areas.

R. S. Agee, Vice President of the Company, also announced the opening of a new factory branch office and showroom at 1 Park Avenue, New York City, where Mr. Emery will make his headquarters. Modern kitchens and ranges will be on display in the showroom, which will also serve as a training center for utility and dealer sales and service personnel. Sales of "Quality" products for new construction and apartment house modernization in the Metropolitan area will also be directed by Mr. Emery from this new branch office.

Mrs. Andersen Appointed to Home Service at Ann Arbor

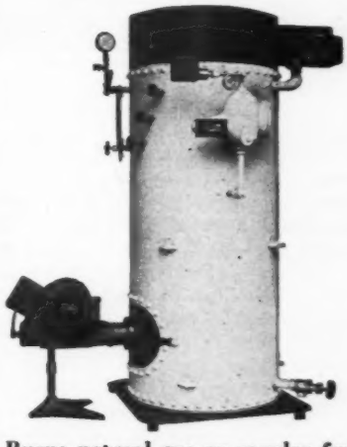
Margaret Woodman Andersen, home service director for the Michigan Consolidated Gas Company in Grand Rapids the past two years, has been appointed director of the home service department for the Ann Arbor district, it was recently announced.

Margaret W. Andersen

Mrs. Andersen succeeds Mrs. Ruth Bush who is resigning after serving with the company since 1935.

Mrs. Andersen was graduated from Michigan State College with a bachelor of science degree in home economics in 1938. She has been associated with Michigan Consolidated Gas Company in Grand Rapids for seven years.

LATTNER
GAS — OIL BOILER
3 HP to 35 HP.



Burns natural gas or regular furnace oils with equal efficiency using same burner.

P. M. Lattner Mfg. Company
Cedar Rapids, Iowa

GOODMAN
USED SINCE 1897
Z HANDLE & LOCKING SLEEVE
GAS MAIN STOPPER

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

Hammond Iron Works Develops New Tank Designs

Hammond Iron Works, Hammond, Ind., for nearly fifty years fabricators and erectors of large steel vessels in the oil, chemical and related industries, has recently developed new features in variable volume tanks. In line with a planned policy of technical improvement, other new products will be made available in the near future.

Ralph E. Kramer, Vice President in charge of sales for Hammond, is located at their New York office, 630 Fifth Avenue.

Ralph E. Kramer

Mr. Kramer brings to Hammond Iron Works 23 years of diversified export and domestic industrial experience in mining, construction, engineering and development.

The appointment of the P. M. Kline Company, 2036 E. 22nd Street, Cleveland, Ohio, as their Cleveland district representative, has been announced. W. J. Piggott and G. J. Robertson, operators of the Kline Company, will represent the full line of Hammond services including the designing, fabrication and erection of tanks of cone roof, breather, sphere, spheroid, floating roof and vapor-lift design and also gas holders.

The appointment of Oilman's Service and Supply Company, 967 Commonwealth Avenue, Boston, Mass., as its New England representative is also announced.

Conference on Industrial and Commercial Gas

The Commodore Perry Hotel, Toledo, will be the scene of the A. G. A. Conference on Industrial and Commercial Gas, March 29 and 30.

Harry A. Sutton, Chairman, Industrial and Commercial Gas Section, American Gas Association, announces that a program for the two day conference has been prepared by Ralph S. Wenner and his committee. This program, which will appeal to all gas men and give them an incentive to develop the opportunities for future expansion in the industrial and commercial gas fields, will be presented in three general sessions and specialty meetings with an industrial gas panel and commercial gas panel.

Highlighting the conference will be the addresses at the luncheon sessions, one by Grove Patterson, Editor of *The Toledo Blade*, and the other by E. J. Boothby, President, American Gas Association.

The program will include informative addresses and papers on: Prepared Atmospheres, LP Gas Standby, Heating for Plastics Processing, Commercial Water Heaters and Boilers, The Industrial and Commercial Gas Engineer's Opportunities, High Speed Direct Heating, and many others of vital interest to all gas men.

This is the Industrial and Commercial Gas Section event of the year, and a large attendance is expected at this first postwar conference.

Edwin Fulton with Tampa Gas Co.

Edwin Fulton, former head of the sales, service and promotion bureau of Richmond's City Utilities Department, has been appointed distribution superintendent of Tampa Gas Co., effective March 1st.

He succeeds Charles O. Clark, who resigned Nov. 1 to go into business in St. Petersburg.

Henry R. Pemberton Elected Board Member of U.G.I.

The United Gas Improvement Company announced that, at a meeting of its Board of Directors held February 26th, Henry R. Pemberton, Director of Finances of the University of Pennsylvania, was elected a member of the Board.

Milener Assumes New Duties with Gas Association

Eugene D. Milener has been appointed coordinator of general research of the American Gas Association effective March 1, it has been announced by H. Carl Wolf, Managing director of the Association. At the same time, Mahlon A. Combs was promoted from assistant secretary of the Industrial and Commercial Gas Section to secretary, succeeding Mr. Milener in this post.

Mr. Milener's new duties consist of coordinating the general and technical utilization research of the Association. In this capacity, he will continue to serve as secretary of the Coordinating Committee on Research, the Domestic Gas Research Committee and the Industrial & Commercial Gas Research Committee. Coordination of Gas Production Research continues to be directed by Edwin L. Hall.

Mr. Milener joined the A.G.A. staff in 1928 in connection with the organization of the extensive program of research and development in industrial gas utilization which he has continued to supervise. In 1935, his responsibilities were increased to include a program of fundamental research in domestic gas utilization under the direction of the Committee on Domestic Gas Research. More recently he has taken on new duties as a result of the greatly enlarged A.G.A. research program.

A.G.A. Non-Ferrous Committee Chairman Appointed

Harry A. Sutton, Chairman, Industrial and Commercial Gas Section, American Gas Association, announces the appointment of C. George Segeler as Chairman of the Non-Ferrous Metals Committee. Mr. Segeler is Utilization Engineer of the American Gas Association, and has spent many years in exhaustive investigations in the field of non-ferrous metals.

A predecessor committee, The Aluminum and Magnesium Melting Committee, of which Mr. Segeler was chairman, has had its scope broadened to include aluminum, magnesium, brasses and bronzes, and will function under the new title.

Objectives of the committee for the coming year will include studies on melting practices and heat treating processes to evolve the most efficient procedures through the use of gas fired equipment. Some activities of the former committee are still to be completed and will be carried on under the Non-Ferrous Metals Committee.

Canadian Notes

Northwestern Utilities Ltd.

Northwestern Utilities Limited of Edmonton, Alberta, announce they will spend $4,500,000 in extension of natural gas services in central and northern Alberta during the next four years. Northwestern Utilities Limited, like its electrical affiliate Canadian Utilities Limited, is a subsidiary of International Utilities Corporation of New York, which is financing developments by the two companies involved in an expenditure of about $7,000,000.

The gas company plans to bring gas to Camrose, Wetaskawin, Lacombe, Ponoka, and Red Deer, and also to lay a new 20 miles of 16-inch pipe from the Kinsella fields to Edmonton.

Julian Garrett, General Manager of the gas company, stated work on both projects would be started immediately and he hoped that if materials could be secured, gas could be piped into these towns before the end of the year. Some of the smaller pipe to be utilized in bringing gas from the Viking field was already on its way to Alberta, Mr. Garrett said.

Two pipelines, about 12 and 10 inches respectively, already link Edmonton gas users with the Viking and Kinsella fields. Addition of a new 16-inch line will increase transmission capacity from the field to Edmonton. It will permit greater consumption in Edmonton as the pressure is increased.

Announcement of the work made by the parent company in New York stated both Canadian subsidiaries have arranged refunding of outstanding bonds in the financing end of the projects. The announcement said $2,500,000 of Northwestern Utilities 4½ percent bonds already have been redeemed through temporary refinancing and the company has negotiated for the sale privately of $4,500,000 of new four percent bonds at par. The free funds, together with other resources, will be applied to reconstruction.

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IRON OXIDE

I can supply you with the Crude Bog Iron Ore, used in Coke and Gas plant, as purifier.

WILLIAM VENNES
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Grand'Mere, Que.
Canada

FOR SALE

One 100,000 Cu. Ft. Stacey Mfg. Co. two lift gas holder in Steel Tank. Tank 58'-4" in diameter x 23' high. Outer lift 56'-0" diam. 22' high. Inner lift 54'-0" diameter. 22' high. This holder can be inspected in Griffin, Ga. It is in very good condition.

Atlanta Gas Light Company,
Atlanta 2, Georgia

ENGINEERS WANTED

Wanted—Gas Engineers with experience on design of Carburetted Water Gas Plants and Equipment. United Engineers & Constructors Inc., 1401 Arch Street, Philadelphia 5, Pa.

General Controls Appoints New York Manager

The appointment of Edgar P. Hollister as Manager of the New York Factory Branch was recently announced by Mr. J. F. Ray, Director of Sales, General Controls Company, Glendale, California.

Mr. Hollister will devote his entire time to serving users of Automatic Pressure, Temperature and Flow Controls in New York State, New Jersey and Connecticut.

Norton Company Appoints Russell L. Peck

Russell L. Peck has been appointed refractories engineer by Norton Company, Worcester, Mass. He will work with Mr. F. E. Leiby and will cover Philadelphia, Delaware, Eastern Maryland, Eastern Virginia and Eastern North Carolina.

Joint Sealing Compound

A general-purpose thread and gasket sealing compound, "Uniseal," is announced by Parker Appliance Company, Cleveland.

Manufacturers claim a high efficiency seal which is proof against air, water, steam, gas, gasoline, oil, hydraulic fluids, and the aromatics. Thorough testing is stated to show virtual insolubility in gasoline, kerosene, Stoddard solvent, benzene, xylene, carbon disulfide, the ketones, acetones and the various aromatic aviation fuels.

Easy to use, it possesses good anti-seize characteristics which aid in the assembly of threaded fittings. Solubility in alcohol and carbon tetrachloride simplifies any cleanup which might be necessary. For dis-assembly and re-arrangement of work on which this compound has been used is easy, as the seal breaks cleanly with the application of minimum force.

Tests have shown it to be effective under severe conditions of vibration, and at temperatures above 300°F. Available in tubes and containers ranging from 8 oz. to 5 gallons.

CHARLES E. WOLLMAN

Charles Edward Wollman, treasurer of the Consolidated Gas Electric Light and Power Company of Baltimore, died suddenly Oct. 10th. He was 56 years old.

A lifelong resident of Baltimore, he entered the service of the company as secretary to the treasurer in 1907. He subsequently became assistant secretary and assistant treasurer of the compayn, and on February 1, 1938, was elected treasurer.

W. G. VINCENT

The Pacific Gas & Electric Co. lost an able and conscientious officer when death came on January 29 to W. G. Vincent, vice-president and executive engineer—a veteran with almost thirty-four years of service in the company. He passed away after an illness of several weeks.

He joined the staff of the P. G. and E. as valuation engineer in 1912. Eight years later he was advanced to the post of executive engineer and in 1922 was made a vice-president, in charge of five departments—valuation, rates, land, statistical and natural gas purchases.

Central Heating

(Continued from page 24)

In spite of these complaints, however, most users seemed satisfied with the service.

For the benefit of those interested in this subject, considerable data on the Summer-Winter Hook-Up will soon be made available by the Institute of Boiler and Radiator Manufacturers and the University of Illinois. The former is in the process of publishing "IBR Indirect Water Heater and Installation Guide No. 3" and the latter is about to publish a research bulletin on the subject.

Data obtained in the field survey conducted by the American Gas Association Testing Laboratories research staff are in process of compilation in a report which will be presented to the Committee on Domestic Gas Research for their information and further disposition.

Presented at American Gas Association Technical Conference on Domestic Gas Research, Cleveland, Ohio, February 18-19, 1946.

Water Heating

(Continued from page 39)

CAPACITY

Since, in the operation of this type of gas-fired water heater as a booster, the water is heated only as it is used, the recovery (water heating) capacity should be visualized in terms of the number of gallons *per minute* which it can supply at a *given* water temperature *rise* or the *rate of flow* which it can maintain.

An example of the recovery capacity—in gallons of water raised a given number of degrees, F., per minute is given in the table above:

To determine the recovery capacity of a given water heater—expressed in terms of gallons per minute—divide the rated, hourly gas in-put by 10,000 and multiply the resulting figure by the water gallonage factor appropriate to the number of degrees, F. which the water must be raised in temperature.

Information covering the application of this type of water heater to booster service will appear in a following chapter.

Western Appliance Installation Code

(Continued from page 13)

(4) Slope. Vent manifold and vent connections shall slope upward toward the vent at a rate of not less than one inch per foot of length.

(5) Connection. The connection between any heater and a vent manifold shall not exceed three feet in length. Vent connections shall approach and intersect the vent manifold so that the flow of the products of combustion will converge at an angle of not more than forty-five degrees.

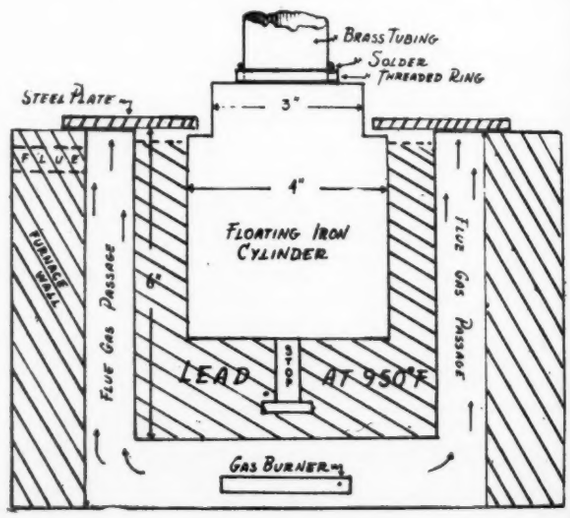
(6) Size of vent: The size of the common vent and the vent manifold shall be not less than the values set forth in the table on page 13.

The code permits the use of a square flue to be used provided its internal width is not less than the diameter of the round flue for which it is substituted. A rectangular flue may be used provided its effective area is equivalent to that of the corresponding square flue and provided the ratio of its internal dimensions is not greater than two to one.

The code prohibits the installation of a damper in any vent, vent connection or patent chimney to which a gas appliance is vented.

Equipment Gives Localized Heat

An ingenious method of providing localized heat for soldering operations has been devised by Royal E. Hunt, industrial sales engineer for The Brooklyn Union Gas Company, for one of the company's customers who manufactures plumbing supplies. The method involves conduction heating, but it has the advantages of induction heating and is achieved at a small fraction of the latter's cost.



Sketch shows how the floating cylinder is kept in place. It was found that within 30 seconds enough heat passed into the ring and end of the tubing to melt the solder which had previously been placed in position and to effect a perfect job.

The customer wanted a method of soldering threaded rings onto the end of brass tubing without heating the tubing sufficiently to cause discoloration. Mr. Hunt solved the problem by floating cast iron cylinders in molten lead and then bringing the work to be soldered in contact with the hot iron cylinders.

Although the sketch shows only one iron float, actually Mr. Hunt placed ten of them in one standard gas fired lead melting furnace, so ten pieces of work can be soldered simultaneously in 30 seconds. The customer is now developing a machine which will place the ten pieces of work in position, hold them there the required 30 seconds, and then remove them finished.

Chief advantages of the new method are the low cost of equipment and that many pieces can be done simultaneously. Other advantages are speed, cleanliness and the fact that the floating heating surfaces make for perfect alignment.

Cast Iron Pipe in Four Municipal Gas Systems in Southern Louisiana

Mechanical joint cast iron pipe ranging in size from 1¼-inches to 6-inches is installed in the gas distribution system of the towns of Houma, Eunice, Thibodaux and Delcambre in Southern Louisiana.

Eunice and Delcambre both installed a municipal gas system in 1939. The gas distribution system at Houma was built in 1940 and at Thibodaux in 1942. Both of these municipalities have had a steady growth and the gas distribution systems have been extended and many meters added.

Distribution pressures range from 5 to 15 lbs. Pipe diameters used are as follows: Houma 2" to 6", Thibodaux 2" to 6", Eunice 2" to 4", Delcambre 1½" to 3".

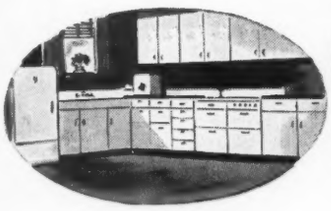
TO MATCH THE HOMES OF TODAY

SMITHway Permaglas

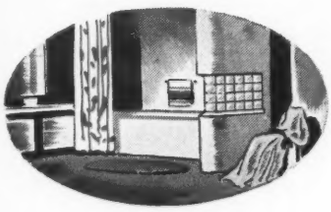
GLASS-FUSED-TO-STEEL

TRADE MARK REG. U. S. PAT. OFF.

GAS WATER HEATERS

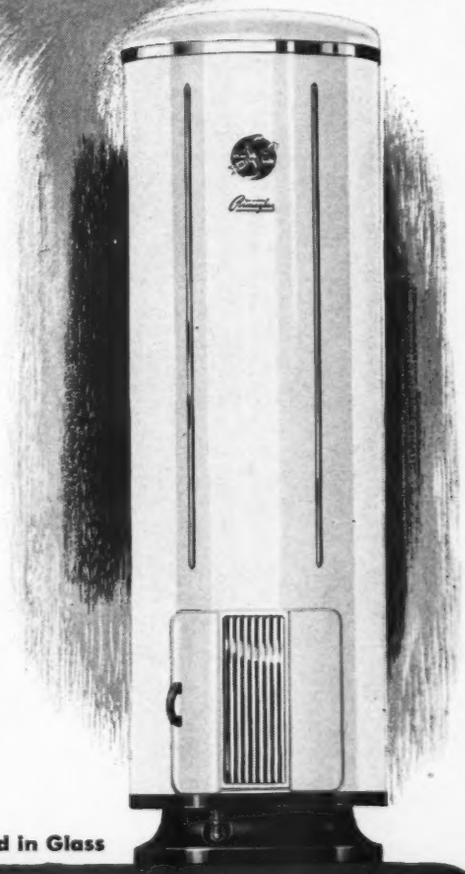


To match the gleaming efficiency, the modern conveniences of today's New Freedom kitchens . . .



To complement the beauty, comfort and convenience of today's modern bathrooms . . .

SMITHway **Permaglas** Water Heaters deliver hot water as sparkling clean as the source itself!



There's Only ONE Permaglas

For the thousands of new homes now being built . . . for every present home that will be improved and modernized . . . here is the *one* water heater that meets in every way the new demand for greater convenience, better performance, longer-lasting service.

SMITHway Water Heaters, lined with *Permaglas*—the sparkling blue, mirror-smooth glass-fused-to-steel—resist tank rust and corrosion under *any* water conditions. *Permaglas* CANNOT rust or corrode!

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With SMITHway *Permaglas* Water Heaters you have the most powerful *new* sales story in the gas-appliance business . . .

The monoquad, glass-lined heater tank. Sparkling clean as a drinking glass. No "tank-corrosion" in the bath . . . no "tank spots" on clean laundry. Hot water as pure as the source itself!

Plus 7 other great features that challenge all comparison.

Heated with Gas . . . Stored in Glass

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